August 1964

Agriculture

Vol. 71 No. 8

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Gun Law	*G. F. Aronson*

Published for the Ministry of Agriculture, Fisheries and Food by Her Majesty's Stationery Office

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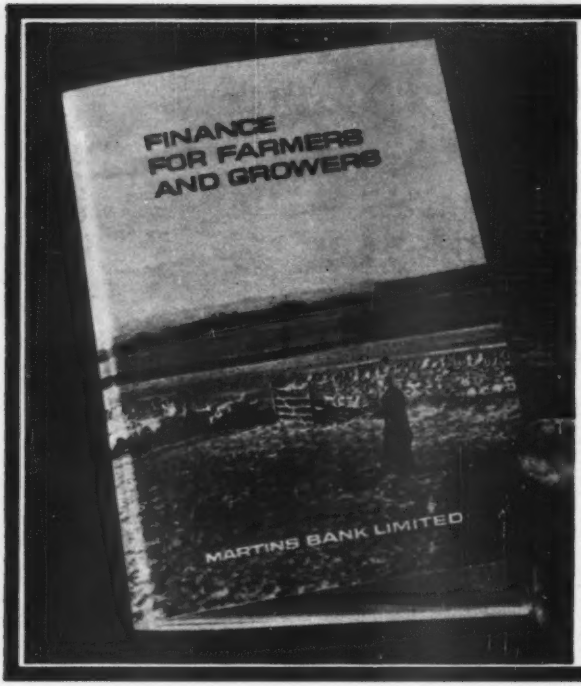

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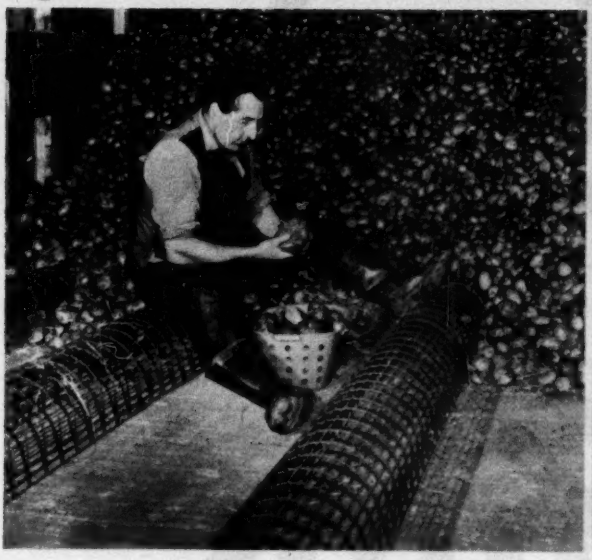
Tips from Ted Moult about FLOOR DRYING



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Ted Moult, T|V and radio personality, is a very practical farmer, keeping closely in touch with modern trends. He farms at Ticknall, South Derbyshire.

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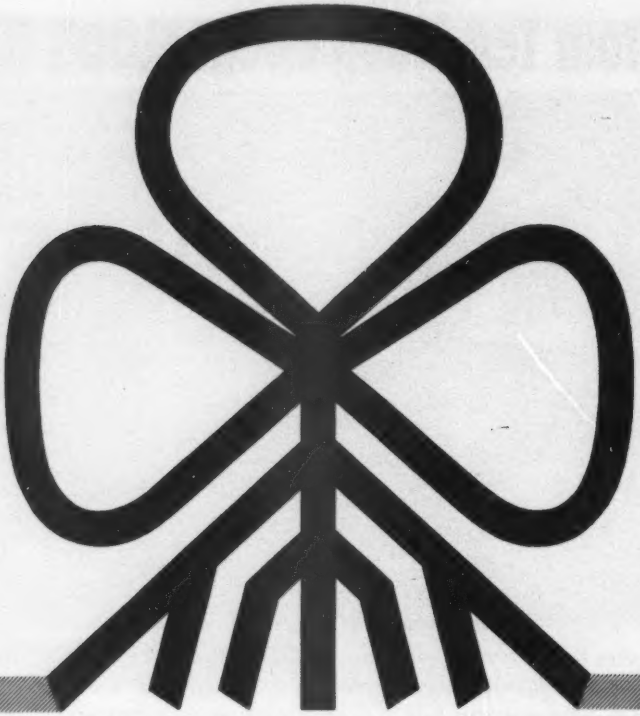

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VOLUME 71 · NUMBER 8 · AUGUST 1964

Editorial Offices
Ministry of Agriculture, Fisheries and Food
Whitehall Place, London S.W.1. Trafalgar 7711

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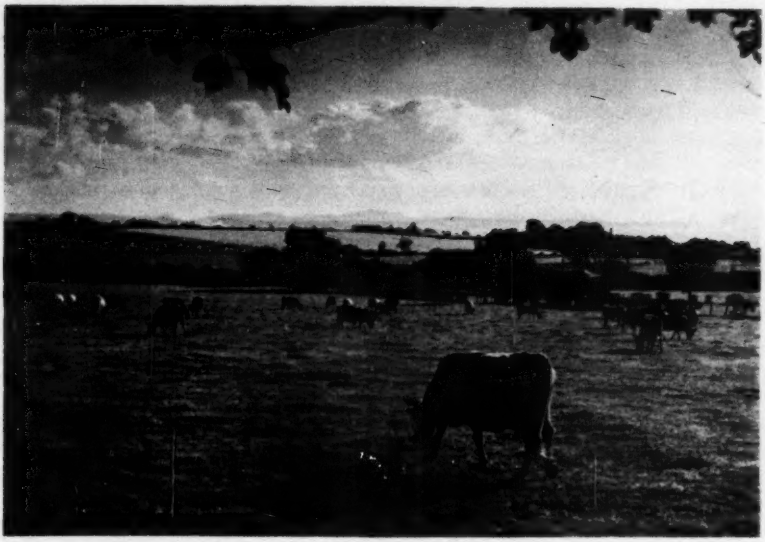

In the Wirral

Watered Concentrate

IF you are in milk production one thing is very certain—there is no single policy or method that can apply to everyone. Such is the complexity of stocking rates, levels of concentrate feeding, yield potential, etc., that any set of figures relating to milk production can be interpreted in a dozen different ways. One sometimes hears the argument that because grass is cheap, any substitution of it for concentrates is sure to increase profits. But this is to ignore the vital importance of the stocking rate.

Similarly, with grass conservation. Hay, silage, dried grass, all can be expensive in their immediate cost of production, losses in feeding value, and labour charges.

But grass for grazing—what Derek Barber has called 'watered concentrate' is quite another matter. There may well be a lot to be said in favour of extending the grazing season at both ends.

The cost of what goes into the dairy cow in relation to what comes out is always worth critical examination. For example, on the subject of concentrate cost, are all farmers who are feeding less than say 2 lb per gallon exploiting their *full* profit potential? Might they not, by stepping it up, get a higher yield and a higher profit—but avoiding *wasteful* feeding? And is there not perhaps something to be said for cutting out all concentrates in the summer and feeding them more generously in the winter?

Successive large investments can cause a serious drain on capital reserves and put a farming business in an increasingly risky position. It will then be less able to withstand a series of poor harvests or a sudden drop in land or livestock values, should these occur

J. S. Nix

warns against

The Dangers of Over-capitalization

BRITISH farmers are spending about £60 million on buildings every year and even more on new machinery. On most farms, the average machinery depreciation amounts to nearly £3 per acre. Allowance for interest on capital tied up in equipment would bring the figure to nearly £4 per acre. Depreciation and interest on farm buildings varies more widely from farm to farm, according to its size and type and the recent level of expenditure. Thus to quote an average figure would be misleading, but for a 300-acre milk and corn farm with recently erected buildings, the annual cost for dairy and grain buildings alone could hardly be less than £2 per acre, even at the traditional 8 per cent of capital cost. Many would argue that at least 12 per cent should be charged.

The annual cost of depreciation depends upon the capital cost of the asset and its economic life. There are various ways in which annual depreciation can be calculated, but these need not concern us here. Except for general implements and a few well-tried machines, many of which have a low capital cost, the biggest factor limiting the economic life of the machine or building is not physical durability but obsolescence. If it were not for the fact that there are farmers with small acreages, little capital or less interest in technical perfection—men who are ready to buy most of these machines at a low second-hand price—the depreciation cost would be even greater.

Large and small farms

There is less variation in depreciation costs per acre between farms of different sizes than might be expected. The small farmer relies more on second-hand machines and contractors, and hangs on to his machines longer. In this way he keeps his depreciation costs more or less level with those of the bigger farmer. Generally speaking, the trade-in value of a machine depends more on its age than its condition. Thus the large farmer who keeps a machine only two or three years may nevertheless have a low depreciation cost per hour of use because he uses it so intensively. The small farmer could not afford to pursue the same policy. Furthermore, the larger the acreage, and the closer to capacity a machine is therefore being used, the less the farmer can afford the risk of breakdowns that exist with a much-used machine. For the same reason, if he does keep the machine for several years he must spend a lot in repairs and maintenance to keep it in first-class working order. The small farmer can rely more on a heavy hammer and baler twine.

We live in an age of rapid obsolescence. No sooner has a new and apparently unbeatable idea been accepted than an agricultural engineer, farm architect or—and in particular—mechanically-minded farmer comes along with a better one. For the farming industry as a whole this is a very healthy sign, but for the individual farmer or landlord it can be highly perplexing and expensive in capital. No sooner has he erected the latest in double-sided tractor-drive-through cowsheds than he is told he should have a yard and parlour. Shortly after his building conversion and abreast parlour are completed, he is told he should have fifty per cent more cows and a herringbone parlour. Hardly has the concrete dried in this new venture than he is informed that he should be installing cow cubicles, slatted floors and organic irrigation. Well may he scratch his head in bewilderment and examine his balance sheet in desperation!

Wait and see

How can a farmer attempt to avoid excessive capital expenditure? The first rule is, when a new machinery or building innovation arrives on the scene, to wait and see. The higher the cost, the longer it pays to wait. There are two benefits from waiting: one is to learn from the experience of others, in order to discover the extent of real benefits and find out the snags. There are always some who are unable to resist a new idea, or who like to be the first in the field and this is very fortunate for others. Many industrialist or businessmen farmers come into this category. Some farmers with large acreages of good quality land, with modest levels of personal expenditure, choose—and can afford—to spend part of their often large profits in this way. The other benefit from waiting is that an even better idea might be just over the horizon.

Some are persuaded to invest in an idea early because of fears that it will gradually increase in cost through inflation. With machinery, the trend is rather the other way. If the machine catches on, mass production and competition between producers usually pull the cost down: this happened, for example, with sugar beet harvesters, crop sprayers and forage harvesters. The same appears to be happening with tower silos. With buildings, where the manual labour element is such a large item, there is more likelihood that costs will rise. Nevertheless, it is better on balance to give a new idea time to

mature and prove itself in practice. Furthermore, a breakthrough in farm building structures and costs could come at any time, particularly in cheaper prefabrication techniques.

Rest content

The second rule is that once having made a decision and bought a particular machine or erected a certain building, be content to live with it and don't keep chopping and changing with every new idea that comes along. One should wait for a really major breakthrough, or an accumulation of improvements that are together large enough to warrant new investment. By then a machine, in particular, may well have done sufficient work to warrant its replacement, in terms of future repair bills and the risk of breakdowns. So many improvements are merely marginal and are not sufficient to justify forgetting yesterday's investment and starting a fresh bout of capital expenditure.

Theoretically, once an investment is made, it can be forgotten in terms of future decisions—except that its sale price, if it has one, must be taken into account. If yet another innovation promises, with certainty, such a large saving in running costs or such a large increase in output that the additional depreciation and interest on the extra capital required will be easily covered, then in theory the investment is worth while. However, relatively few machinery or building innovations are so clearly economically advantageous. The introduction of the combine harvester, the pick-up baler or the forage harvester are examples of such breakthroughs—although even these are not worth while in all circumstances, even today. Subsequent improvements have been only very gradual.

A third rule is not to run oneself short of working capital, such as fertilizers and livestock, by investing too large a proportion of capital in machines and concrete. The return on working capital is usually far higher. This point is particularly important for men who start in farming with limited capital. Fertilizers and stock quickly generate further profits and capital to plough back into the business. The same is less likely to be true of machinery and, in particular, buildings. This rule amounts to investigating all possible uses of capital and investing where the return is likely to be greatest, having regard to comparative risks.

Flexibility

A fourth rule is to retain as much flexibility in the farm economy as is economically feasible. Unfortunately this is easier to say than to do—with machinery especially. There are few machines, apart from tractors and general tillage implements, that will work as well on one crop as another. For example, some people have advocated the use of forage harvesters for haymaking, but technical experts have decried the leaf loss thereby caused. Whether the loss in feeding value exceeds the saving in costs of specialized haymaking equipment has never, to my knowledge, been examined. There should at least be possibilities where the farmer makes mainly silage and only a little, supplementary hay.

Two ways of achieving flexibility with regard to machinery are firstly to keep to hand labour and secondly to rely on a contractor. In both cases one is incurring an annual cost that can be terminated at any time, except that

a reduction in regular staff will depend on seasonal labour requirements throughout the year. The larger the capital cost of the machine and the more doubtful its economic lasting value, the stronger the case for hand labour, while it is available, or the contractor.

With buildings, flexibility can again consist of making do temporarily with a more labour-consuming method, or with hiring a contractor, as for example with grain storage. There is also the possibility of the multi-purpose building. This reaches its ultimate in the concept of the 'umbrella' building, with interior fittings to suit the year's—or tenant's—particular fancy as regards cropping and livestock policy. This is another idea which sounds better than it looks in practice. Large spans are expensive, and one could end up with an expensive hanger-like structure with equally expensive fittings within it. However, there must be scope here for compromise. Buildings are possible which could do equally well as a potato store, a grain store (either on the floor or in cheap wire-mesh bins), a covered yard for dairy cattle or beef, or possibly for the indoor wintering of ewes. Flexibility is an important factor in favour of floor storage of grain as compared with the highly promising, and similarly priced, alternative of moist grain storage in sealed silos.

Where insulation, ventilation and possibly lighting requirements are more critical, as with bacon and poultry production, the case for the multi-purpose building compared with the specialist building becomes weaker. The specialist building may give more profit in ten years than a general-purpose building would in twenty-five. If a specialist fattening house with a throughput of 600 baconers a year produces an improvement in conversion rate of 0·5 lb of meal per 1 lb liveweight gain, this is worth £600 a year—enough to cover a large addition to depreciation and interest charges. The main aim must be to get a technically efficient building as inexpensively as possible. Better that it should cost £12–15 a pig and fall to pieces in ten years than that it should cost £20–24 and last fifty, but be out of date or out of use after ten. Another pitfall to avoid is to spend considerable sums on automatic equipment to save small amounts of labour, when labour constitutes only ten per cent of total costs in pig production.

Tax concessions

Rule five is to avoid being tempted into excessive capital spending by tax concessions, unless tax is being paid at rates well above the standard rate. The investment is economically justifiable only if it increases profits enough to cover the addition of fixed charges. This profit is subject to tax, which cancels out most of the tax concessions. Only tax relief on the investment allowance is net gain, but most farmers would do better to ignore this. To obtain it, capital has to be sunk and lost to alternative, possibly more profitable, uses, and one runs the risk of heavy depreciation through early obsolescence.

Will-o'-the-wisp perfection

Finally, rule six is to avoid seeking technical perfection for its own sake. Some farmers, especially those who have inherited a large acreage of high-quality land, can afford to do so, but most cannot. In any event, even to make the attempt in these days of almost continual technical progress is to seek the unattainable. Particularly expensive pieces of equipment should be scrutinized

lest the savings in labour and improvements in efficiency that they promise should prove to be illusory. Examples are sealed tower silos for haylage, organic irrigation and high throughput combines. All may be justifiable in certain circumstances, particularly the last, and all could become more so in the future. On most farms at the present time, however, there are cheaper alternatives which, even if they use a little more labour or are a little less efficient, are much to be preferred.

More factual information is needed on the additional feeding value of haylage compared with well-made clamp silage; should this prove to be substantial and the towers continue to fall in cost, then no doubt they will multiply. However, in a dairy herd the saving in labour costs is small or non-existent, and the profit margin on beef is insufficient to bear heavy capital costs. To justify organic irrigation, the dairy herd needs to be at least 80 cows, or to be linked with a large pig unit; on most farms a co-operatively-owned slurry tanker looks the ideal answer, pumping or running the slurry out on to the land from the roadside where and when the land is too heavy or wet for the tanker. The main drawback of high throughput combines is the additional expenditure they often incur for handling and drying equipment. On the large, mainly cereal-growing farms, with the main labour peak at harvest time, this will often be justified, but other farmers should think twice before involving themselves in yet a further bout of capital spending on their grain enterprise.

Cow cubicles are an example of the ideal type of investment. They cost little and, provided the slurry can be cheaply handled, they should pay for themselves in a year or two in areas where straw is scarce and therefore expensive. Even this is no reason why every West Country dairy farmer should install them tomorrow. Apart from the possibility of yet higher returns elsewhere on the farm where capital is very limited, another Howell Evans may have an even better idea tomorrow.

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* *

Alternatives to Magnesian Lime

In a report in the July issue of *Agriculture* on the work of the Experimental Farm at Trawscoed, Aberystwyth, about increasing the magnesian content of herbage, it was indicated that where a farmer needs to lime his land the choice of dolomitic limestone would generally provide the cheapest form of magnesium to apply. This advice took into account that as a source of lime, magnesian limestone attracted subsidy under the conditions of the Agricultural Lime Scheme 1959.

Since that report was published a new Lime Scheme has come into operation. The Ministry now pays flat rates of contribution towards the cost of lime and spreading it. In addition, contributions towards transport are in most parts of England and Wales not payable on journeys above 50 miles, or in Scotland above 100 miles.

Under these conditions magnesian limestone, although it continues to attract subsidy for its liming value, may no longer at the same time be the cheapest source of magnesium. Alternative methods of raising the magnesium content of herbage by the use of Epsom Salts or ground Magnesite may be cheaper. Farmers should therefore look at the relative cost of each of these methods before deciding which best suits their purse.

In some areas, especially those close to the centres of production of dolomotic limestone, these forms of lime may, of course, still be the cheapest to a farmer whose land needs both lime and magnesium.

Streamlining the handling of flowers from cutting to dispatch pays dividends in time and money

FLOWER FLOW

D. Mellard

'WHERE have all the flowers gone?' asks the song. We are not here concerned with the 'where' but rather the 'how', though it is true that the one bears directly on the other. Often we find improvements in flower production techniques are not matched by handling facilities. Buildings and layouts devised piecemeal as enterprises grew are now found to be imposing work routines which waste time, effort and money.

But possible changes in one sector must be related to the business as a whole; it would be wrong to seek absolute efficiency in grading and packing without reference to its contribution to the economy of the whole holding. Getting the right combination of enterprises, the right levels of cropping, right timing, right husbandry—these come first. Once yields and quality are assured, handling methods and costs assume their correct significance.

Counting the hours

Of the total labour hours required for the production of direct-planted chrysanthemums, harvesting (and that includes cutting, grading, packing) can account for 35–38 per cent, but within this figure the hours allocated to packing and grading can range between 12½ and 25 per cent of the total.

Packing narcissus on a method-studied bench at nurseries in Hampshire. All the materials necessary for the job are ready to the packer's hand

With blooms of uniform variety, quality and condition, there shouldn't be so very much difference between holding and holding in the time required to cut or to pack when the workers are suited and accustomed to their task and using similar market boxes. The major differences in productivity arise because of differences in work sequence and methods between cutting and dispatch.

A quick break-down of two observed harvesting and packing routines will serve to indicate how existing methods may sanction unnecessary operations: **FIELD GLADIOLI:** cut; carried to boxes set on headland; filled boxes loaded to trailer; boxes off-loaded to stillage at shed; stillage to bench; boxes lifted to bench; blooms trimmed and bunched; bunches placed in cans on stillage; stillage of cans to packing line; bunches lifted from can to box on conveyor; box pushed to packer; blooms lifted from box for packing in market container. **CARNATIONS:** cut; secured in bunches laid in trays; trays loaded to truck; trays off-loaded at shed to bench or floor; bunches opened for grading as single blooms; blooms laid in rack in 36's; trimmed; graded blooms carried to buckets; picked up from buckets, carried to packing bench; packed; packed boxes carried to dispatch area.

The first example requires eleven, the second ten, handlings of the bloom, either singly or in bunch, from the operation of cutting to the final laying in the market container. Every handling offers another opportunity for deterioration in quality. Nor is this the whole story, for these simple outlines do not show up the effects of container weights when picking up and putting down, or the effect on worker productivity of walking to and from work stations and materials. Movement as such is unproductive, adding only to cost and not to value.

Challenge

To arrive at the best way of working for a given set of circumstances, the existing method must be challenged and pre-conceived ideas abandoned.

How is cutting done? How much inspection is necessary? Are both hands used? If not, why not? Because the cutter has to carry severed blooms? Why? Is a container to hold the flowers feasible? If so, what size, what shape? Where—on the bed, on the floor, on the worker? Would it take more time or invite damage to assemble blooms in a container and move this, than to cut single-handed into a bunch on the 'free' arm?

We may also ask whether walking up and down the paths with cut flowers can be eliminated (overhead take-away?) or minimized? Is it not possible for the cutter to start at one end and work through? How does bed layout affect movement? How many blooms should be bulked together? Where are the gathered blooms set down? In the house? Outside? How are they moved to the shed or store? Carried? Trolley or vehicle? How far? What unit of cut blooms is moved? Can this unit be increased—what factors limit larger loads? Path surfaces and widths? Door widths? Slopes? Steps or sills? What improvements are possible here? At what cost? What benefit will accrue to other movement on the holding? And so on, through the whole sequence of operations from cutting to dispatch.

In movement from cutting to the shed or store the aim is the largest practicable unit; doubling the load halves the transport time. Ideally, flowers should remain in this unit until next worked upon. This leads to consideration of the need to stand blooms in water prior to packing. If moved immediately after cutting, blooms can be transported dry, in buckets, mesh-bottom crates, plastic baskets or trays on trolley, trailer or tractor, according to subject and scale of enterprise. The over-riding consideration must be control of *quality:* least handled is best handled.

Packing shed work-flow

We come now to the question when should quality grading be done. With some crops, e.g., single bloom chrysanthemums, grading at cutting is possible, the fastest operator cutting the first quality and so on. Or it may be carried out at packing, again to eliminate the need for a separate grading handling. In a recent study of AYR spray chrysanthemum packing this combination of grading with packing gave a saving of over two minutes per unit of thirty stems. The number of *skilled* graders required and available may necessitate carrying out quality inspection separately, especially at peak output when meeting a packing deadline. It is axiomatic that 'grading begins in growing'—the amount and degree of variation from the desired first quality influences the grading performance and the facilities required.

The causes of low packing section productivity most frequently met are cramped space and impractical layouts which make jobs unnecessarily difficult. Space costs money, but so does lack of it; and in many sheds 80 per cent of the floor area is occupied by buckets of bloom in water. There is needless fetching and carrying of materials, which wastes productive energy. Packers are paid to pack, and for maximum productivity they must develop the rhythm of skilled movement without breaking off frequently to fetch small lots of flowers or seek materials. The greatest difficulty is in feeding the blooms and containers to the packer. The conventional long fixed wall bench does not always make for a good work-flow. One answer is to service the packer with blooms and market containers and take away the packed boxes for sealing and segregation. This allows for the use of less skilled labour to implement packer productivity. Scale of operation may warrant

power or gravity conveying of materials, with the packing benches at right-angles to the flow-line.

Alternatively, the packer can move the flowers by the use of a lightweight mobile bench, designed on the principles of motion economy and incorporating such features as draining board, grade dividers, waste chute and box well or shelf set below bloom level. Depending on the mode of packing specified by management, there will be a *correct* and *defined* position for such items as lining paper, cross sticks, tape, rubber bands, calyx rings, foliage and tickets. Specialization makes design more easy—roses may require a multigrade bench for five grades, carnations for three, whilst tulips will be one quality plus seconds.

Presentation, protection, convenience

There are no universally acceptable recommendations on market containers. It is easy to project a change to an unlined fibreboard box with card spills as requiring less handling time than cleaning out and papering the equivalent wooden returnable, but the final arbiter is the preference of the intended market. The consistent quality of the contents at point of sale will determine what premium the selected method of presentation commands. Every addition to the number of types and sizes of containers for holding and transporting our materials leads immediately to additional handling and adds to the difficulties of storage. Containers apart, there is surely scope for improvement when, of the 2½ minutes it takes to paper a chrysanthemum box, only half a minute is actually spent positioning the linings—the remainder being box movement and handling.

Plan for flexibility

Dry packing, sending in bud, sleeve packing, bulk packs, wrapped bunches in clear film are all under review, and a change to any of these techniques could influence the growers' market preparation system. It seems wise, therefore, to plan for flexibility of layout and storage facilities, whether the need is for finding better ways of using existing resources or planning new installations. With new packing sheds, it is best to plan the methods, equipment and layout first and then put the building round it, rather than the reverse. Space requirements can then be related to peaks of production and congestion is avoided.

There can be no best method irrespective of circumstances, for management stipulations and resources do vary. What is wanted is not looking for savings of seconds of time or inches of movement but the means to achieve the best output per worker-hour without drudgery, whilst maintaining the maximum control of quality.

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TWO-STAGE EXPERIMENT AT ROSEMAUND

- **THE BULL**
- **THE PROGENY**

G. P. Chater

How good is the bull?

THE pedigree breeder must consider each bull on all its merits in his attempt to continue to improve his whole herd. The farmer-user of the progeny is mainly concerned with milk yield or daily liveweight gain. Beef sire performance testing on pure breeds has been practised in some countries for many years, and the results have been used to help obtain calves with the capacity for rapid liveweight gain, efficient food conversion and good fleshing qualities.

A performance test of the beef sire and his cross-bred progeny was started at Rosemaund Experimental Husbandry Farm in the autumn of 1957. Each year, for four years, ten Hereford bull calves born in late September or October were selected to represent a range as suitable for crossing with dairy cows. These calves were taken from their dams and suckled on Dairy Shorthorn foster-mothers.

First stage: Bull calves

The objects of this test were to measure and compare the growth rates, efficiency of food conversion and visual merit of selected Hereford bull calves when reared under uniform conditions.

A short period for settling down was allowed before the calves actually began their test, when 34 days old—80 days in the first year. The amount of milk consumed by each calf was estimated by weighing the calf before and after suckling on two days in each week. By switching the foster-mothers from calf to calf, it was arranged that each calf had consumed a similar amount of milk by the time it was weaned at the age of 181 days. Each calf was housed individually, hay was available at all times and concentrates were fed according to appetite.

The second phase of this test was from weaning until the calf was 400 days old. During this period concentrates were fed three times a day and a mash at night. Good hay was always available, but the amount of concentrates was limited to the edge of appetite by the stockman in order to avoid digestive disorders, while allowing each calf to express to the full its potential for growth.

The concentrate ration was modified after weaning and again at nine months. Samples of all food used were frequently analysed and everything offered was weighed in and any refused weighed out. The average amount of food taken by each bull during the whole period of test was: 330 gal of milk, 11 cwt hay, 25 cwt meal mash, 2½ cwt sugar beet pulp, 1/3rd cwt milk substitute and 3 cwt fresh grass.

Up to weaning, exercise was given in open concrete yards and thereafter they were driven twice a day around grass paddocks that had been closely grazed by sheep to avoid any grazing by the calves. The distance covered daily was at least two miles. At nine months old all were regularly halter-led on farm roads. All calves were inspected at monthly intervals by a veterinary surgeon, their feet trimmed and horns trained when necessary, groomed every day and washed at longer intervals. They were weighed once a week, on three successive days each month, at the beginning and end of the test, and at weaning.

Results

The daily liveweight gain of all bulls tested during the four years varied from 2·27 lb up to 3·08 lb, but the average gain each year varied from 2·50 lb to 2·76 lb. The gain on an individual animal should only be compared with another within the same year. The highest gain (3·08 lb) was obtained when the average gain for the year was 2·76 lb, while the gain of 2·27 lb was in a year when the average was only 2·60 lb. A number of bulls of similar age were weighed at the Hereford Herd Book Society's sales in the autumn of 1959 and 1960. The variation between these bulls was 1·75 lb up to 2·93 lb, which can be accounted for partially by the wider variations in feeding management. This serves to emphasize the importance of uniform conditions if comparisons of liveweight gain are to be made between performance-tested bulls.

The consumption of food by individual animals varied, but over the full test period the use of food was closely related to daily liveweight gain.

At the end of the test each rearing was placed in order of visual merit by a panel of breeders from the Hereford Herd Book Society. Some 'high gain' bulls were placed low on visual merit.

Second stage: Progeny

The second stage of this experiment was to test the progeny of each bull under standard conditions for liveweight gain, food conversion and carcass quality. After the bulls had been presented for licence they were used at A.I. centres to inseminate Friesian-type dairy cows. Calves from all bulls have been reared and fattened under standard conditions and slaughtered when weighing $8\frac{3}{4}$ cwt at about 17 months old. This stage has not been completed.

Although liveweight gain is the most important requirement to the commercial beef producer, good health, virility, long life, ability to put on flesh in the right places and to conform to the best breed characteristics are essential requirements of the breeder if his bull is to be proved good by the performance of his progeny.

G. P. Chater joined the N.A.A.S. in 1946 as District Advisory Officer in the Weald of Kent. He moved to the West Midlands in 1950 as Regional Hops Adviser and in 1961 was appointed Director of the Rosemaund Experimental Husbandry Farm.

Machine Stripping

Is it really necessary?

asks Peter Clough

The author, who is a member of the staff of the National Institute for Research in Dairying, suggests that it can be omitted without ill effects and so save valuable labour time

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THE question of machine stripping is exercising the minds of most farmers using milking machines. Some have already decided not to machine strip for one reason or another, but the majority still follow the traditional practice of assisting the machine to remove the last few ounces of milk from the udder. How necessary is it?

When hand milking was universal it was normal and reasonable practice to remove all the milk available once let-down had occurred, and this usually

required that towards the end of milking a change would be made from full hand milking to using the thumb and forefinger. The removal of the last drops of milk was felt to be important in ensuring maximum lactation yield and fat percentage of the milk. It was believed that lactation yields and fat percentages would be reduced if any milk was left in the udder at the end of milking. Even when it was known that milk secretion was a continuous process, and that whatever procedure was followed there would be 10–20 per cent of residual milk which could not be removed from the udder, the practice of stripping continued.

When machine milking was first practised the teat-cup cluster was normally removed when milk flow declined and the final 10–15 per cent of available milk was removed by hand. This procedure was modified as the use of milking machines developed and the practice of machine stripping became prevalent. When the milk flow dropped to something like ½ lb per minute, downward pressure was applied to the claw-piece and individual quarters massaged to force milk down into the teat cistern, from where it could be withdrawn by the machine. During the past ten years various designs of teat-cup liners have been evolved to reduce the tendency for milk flow to be interrupted by the upward movement of the teat-cups when the teats became flaccid.

Time-consuming chore

Machine stripping is an unwelcome task which limits the milking performance of a man, since machine stripping may account for 20–40 per cent of his work routine. For example, in milking parlours it is well known that a full work routine, less machine stripping, can be accomplished in 1½ minutes per cow, and thus a man could attend 40 cows per hour. If machine stripping is practised for, say, half a minute per cow, the total routine time becomes two minutes and thus the man's performance is limited to 30 cows per hour.

This is extremely important now that herd sizes are increasing rapidly, because milking can be the factor which limits the size of the herd a man can manage. It is obviously necessary to plan work on a daily basis. To limit the length of the working day, milking must be fitted into a reasonable period at the beginning and end. Any way in which the work routine during milking can be reduced will enable the milker to operate more milking units and so milk more cows per hour. Thus a man who can operate three units and milk 30 cows an hour when doing machine stripping would be able to operate four units and milk 40 cows per hour with no stripping.

It is known that incomplete milking (when only 90 per cent of the expected yield is removed from an udder at each milking) will result in lower milk and fat yields. It is also known that the fat percentage of milk increases throughout milking, and on the first occasion of incomplete milking the fat percentage of the milk removed will be relatively low. But at subsequent milkings the fat percentage will rise to the normal value and remain at this level.

No great loss

Recent results from heifers at the N.I.R.D. have shown that the lactation yield was only reduced by the amount of milk left in the udder when no stripping was done, and the average amount of milk left in the udder was 0·6 lb/milking. These results suggest that when small quantities of milk remain

in the teat and udder cisterns, there is no marked drop in the persistency of lactation or the yield of milk or total solids.

Other trials have shown that with six different commercial teat-cup assemblies used to milk 30 cows, the average amount of milk remaining in the udder when milk flow ceased was 0·34 lb for the most efficient, and 0·64 lb for the least efficient of the assemblies. These quantities of milk would be removed by machine stripping in 0·55 to 0·75 minutes. At these levels the total reduction in lactation yield, based on a 300-day lactation, would be from 200 to 400 lb.

Effect of teat-cup cluster design on stripping yield

Cluster	*Weight*	*Peak flow*	*Strippings yield*	*Machine time*	*Total milk yield*
	lb	*lb/min*	*lb/cow*	*min/cow*	*lb/cow*
1	6·75	8·2	0·52	7·4	25·7
2	6·60	7·4	0·45	7·7	25·4
3	7·60	7·0	0·36	7·9	24·6
4	6·75	6·7	0·54	8·2	24·9
5	6·20	6·6	0·64	8·0	25·0
6	6·50	6·0	0·53	8·1	24·6

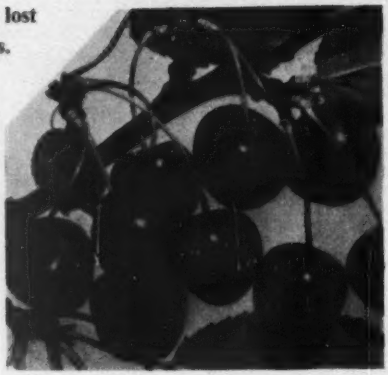
In so far as a particular herd output of milk is important, it would now seem feasible to discontinue machine stripping with the teat-cup liners that are available, since the addition of one extra animal yielding, say, 9,000 lb of milk per 25–30 cows would result in the same herd yield, and the milker would be able to use another milking unit and milk an extra ten cows per hour every day. In smaller herds of high yielding cows, where there is ample time for a longer work routine, machine stripping might still be practised because the total yield per animal is the most important factor.

The problem of udder health has often been raised in connection with machine stripping, but it is known that more cross-infection is likely to occur in herds where machine stripping is practised then where the udder is not handled, and the small quantities of milk remaining in the teat and udder cisterns are unlikely to result in inflammation which would pre-dispose the animals to clinical mastitis.

It is obvious that more research work must be done on the design of teat-cup assemblies to further reduce the amount of milk left behind after milking. On balance it would seem that with the trends towards more cows per man, machine stripping can be omitted from the work routine without any serious effect on lactation, milk, fat and solids-not-fat yield.

Roger Folley

4,500 acres of cherries lost in the past eleven years. What of the future?



English Cherries

A crop in decline

ECONOMICS has a phrase for the cherry situation—perversity of supply. Interpreted for the layman, this means that potential demand is increasing—and higher prices will be offered—but supply will not respond in the way it normally would, and will continue to diminish.

This is a safe statement to make as far as the next fifteen years are concerned. During that time production capacity must remain fixed. Thereafter it will be a quite unexpected development if the acreage of cherries in England increases for 1975–80 by as much as market forces suggest that it could profitably increase.

In other words, there are economic resistances 'built-in' to cherry-growing which ordinary financial incentives are not strong enough to overcome. Some of these resistances, like the hazards of ladder-work, are well-known and overt in character; others are covert and have their origin in the nature of cherries as a farm crop—a crop which has to be grown in conjunction with other crops to make a viable farming system on a fixed area of cultivable land. This 'farm management' type of approach to cherries will be made apparent in the body of this article.

The next fifteen years

Nothing that growers can do will materially improve the annual output of cherries in the next fifteen years, because it takes that length of time to bring a new cherry orchard into production; and new orchards are the only way to increase output. Cherry trees on good sites do respond to additional manuring, but it is much less likely that indiscriminate additional manuring will produce additional saleable crops—perhaps because the cherry tree in England is on the geographical margin of its natural habitat and there are biological factors limiting production which a boost of chemicals in the soil does not remove.

Two other factors limiting the response in yield are, first, the cherry's habit of not bearing more than two big crops in succession, and, secondly the declining state of vigour of existing orchards taken as a whole. Fruit census data tell us, indirectly, that of the 14,000 acres standing in 1962–63, probably 1,500 acres are young and untried, 7,000 acres are in middle life and 5,500 acres are in a decline, notwithstanding small growers' efforts to rejuvenate orchards by planting new trees, singly, literally in place of the old.

The *net* loss of cherry acreage in the last eleven years has been 4,500 acres: about three times that area is now left. Looking ten years ahead, then, it seems reasonable to assume that in the early 1970s there will be no more than 11,000 acres in bearing, most of which will have already given of its best. The national crop to be anticipated in these circumstances will amount to some 18,000 tons (down to 10,000 tons for a light crop), compared with the present 'normal' 23,000 tons.

Is this the end of cherries?

No one with an eye to business gets very excited over a product having a declining market. In most cases loss of economic popularity in the product means that it is either being superseded by a cheaper alternative or otherwise losing its place in the daily life of the community. True, the fresh cherry is a delicate fruit, has a short season of marketing, is not easy to gas-store and cannot be 'groomed' in the same way as apples and pears to give it good size and appearance. Cherries are marketed 'as picked' and they are picked 'as grown'. Nevertheless, there is no known substitute for the fresh cherry and its place in the daily life of the community should be just as assured as in those days when the cries of itinerant sellers rang through the streets.

If the direct offering of cherries in those bygone days was the result of the same indifference to cherries in the shops as exists today, something is very amiss in the marketing of the crop. It may well be that too many consumers have found cherries unreliable in quality: consequently they do not buy with confidence, and then only at a price which makes allowance for the risk of disappointment. In this event, it will take years of investing cherries with solid worth as a purchase before their market acceptance as a whole can be improved. What growers would really like to know is how much they could expect consumers to pay for a consistently good sample of cherries. This calls for local experiment.

It is perhaps symptomatic of the overall decline in quality that more and more cherries each year go for processing—now one-eighth of the English crop. The price for cherries for processing averages no more than 50–60 per cent of that for the market crop, and the white varieties which processors prefer do not give markedly higher yields an acre than market varieties.

Nevertheless there appears to be virtue in some situations in growing cherries solely for processing.

To plant . . . or not?

Considering that growers are faced with an investment approaching £400 an acre in forming a new cherry orchard, they cannot be expected to make a quick decision about the future.

Perfectionists are in effect asking growers to make right decisions about replanting for the next generation, even though authorities like population scientists are none too sure what to expect. Growers seem to have two rules of thumb:

(a) to re-plant, without expansion, because there is no pressure to change the acreage of cherries on the farm;

(b) to grub and not re-plant, because the land cannot be allowed to be 'idle' whilst the cherry trees are growing up.

Few growers, if any, want to plant cherries, or even to expand their present acreage. In 1961–62 Wye College carried out a survey of Kent cherry growers' intentions: one-half of the growers were for ousting the crop, one-third were in favour of continuation, one-sixth were undecided. The one-third in favour of cherries, however, farmed two-thirds of the present acreage.

Even without an intimate knowledge of cherry-growing, this pattern of response tells us a lot about the crop. For one thing, cherries are more acceptable on large farms than on small; for another, there are many types and sizes of farm where cherries do not fit in. Following up this approach, it will be seen how dominant the 'farm management' aspects of cherries are in comparison with market aspects. It will need a very substantial improvement in market prices to induce an overhaul of the place of the cherry orchard in Kentish farming.

Cherries as a farm crop have a number of peculiarities. More than any other orchard crop, they demand (for long-term success) a good situation—ample depth of soil, minimum elevation, a mild spring and freedom from summer hailstorms. These requirements set limits to the area available for their cultivation. Given suitable land, it is wanted in quantity. There is little future in the isolated 2–5 acre piece unless the fruit is intended for delivery locally and the grower has an active young family. Otherwise, the depredations of birds or the cost of scaring them, are likely to be prohibitive. The minimum economic size of an independent cherry orchard is put nowadays at 12 acres.

The next question is 'who has £4,000 to £5,000 available these days to lock away in a cherry orchard?' The answer: only farmers with ample resources, who can afford to be without cherries, or with large farms, on which the orchard could be 'lost' for fifteen years or so.

Given an ideal area and adequate resources, the prospect of harvesting the crop would deter many a potential grower. Crops in large orchards are not usually offered for auction; and in order to keep together a gang big enough to pick a large acreage, complementary work on the farm has to be provided for them. The most entrenched cherry growers have a succession of crops for the gang to pick: but this traps them into having a mixed farm and an inextensible acreage of cherries. Mechanization of harvesting would be one means to greater specialization on cherries, but the technical difficulties have so far deterred much experiment.

In spite of this long catalogue of shortcomings on the farm, a crop of good—and they will have to be good—English sweet cherries, if produced under the right conditions and effectively marketed, offers higher net returns per acre than either apples or pears. When his trees are established, the cherry grower who made the right decision will quickly forget his long period of investment and of waiting.

Formerly with the Agricultural Economics Research Institute, Oxford, **Dr. R. R. W. Folley** is now Senior Lecturer in Economics, Wye College. The book, *The Cherry Situation*, which he and **A. R. Hunt** wrote last year, was reviewed in our June issue.

Calf pneumonia is very common and may be a cause of heavy losses, particularly under intensive systems of management. A recent survey has shown that at least one agent known to cause pneumonia (parainfluenza 3 virus) is widely distributed; 93.7 per cent of slaughtered cattle in the survey were found to possess antibodies to this virus. Very likely other agents may be involved and be equally widely distributed. With so wide a distribution of such agents throughout the cattle population, it is not surprising that calf pneumonia is a constant hazard

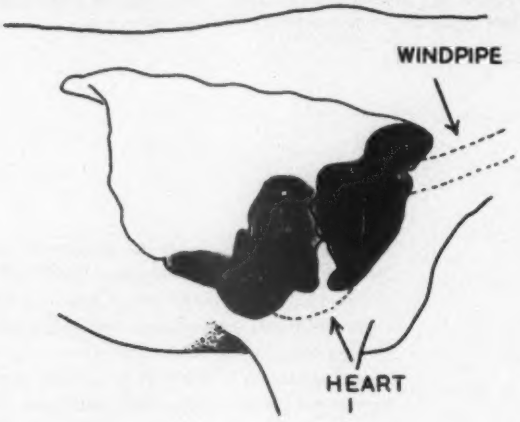
Calf Pneumonia

a constant hazard

David Kinch

PNEUMONIA is really an inflammation of the lung. The cells forming the delicate network of air spaces become swollen and the blood supply to the affected area is increased. Fluid and white cells from the blood are released into the air spaces to counteract the cause of the inflammation. These changes prevent the normal functioning of the lung—the uptake of oxygen and release of carbon dioxide—and consequently reduce the total oxygen uptake. The body compensates for this by increasing the rate of supply of oxygen. This is done simply by increasing the rate of breathing, and in fact rapid breathing is

one of the very first signs of pneumonia. Infection of the main air passages and the nasal sinuses results in coughing and dirty noses. In addition, constipation, poor appetite, listlessness and high temperature are common if the pneumonia is acute. At post-mortem examinations the lesions of pneumonia are found in the front of the lung, as is illustrated in the diagram below; they are plum coloured, in contrast to the pinkness of healthy lung tissue.



What is the cause?

A great number of infectious agents are associated with calf pneumonia. Among a variety of bacteria, the following may be isolated at a post-mortem examination: Salmonella, Pasteurella, the pus-forming organism *Corynebacterium pyogenes* and, of course, our old friend *E. coli*. A proportion of pneumonic lungs are bacteriologically sterile, and these are loosely called 'Virus Pneumonia'. Many viruses have been isolated from pneumonic lungs in calves and also a number of Mycoplasma (micro-organisms intermediate between bacteria and viruses). Parasitic lungworms may also cause a pneumonia, but they are never seen unless the animals have been out to grass. One can see, therefore, how varied the causes of calf pneumonia can be. In fact, pneumonia is probably caused by the interaction of several infectious agents, virus and bacterium together with environmental factors.

How does infection get into the lung?

The distribution of the lesions indicates that the infective agent enters by way of the air passages. The infection in the air comes from another animal. Every time such an animal coughs or sneezes thousands of tiny droplets of saliva and phlegm are sprayed into the air. A proportion of these droplets will contain an infectious agent. Visible droplets quickly fall to the ground and are of little consequence. It is the tiny invisible ones which are very much more important, since they remain in the air for longer periods, and so greatly increase the likelihood of infecting other calves.

It is important to realize that these infectious agents cannot live long outside the animal. Residual infections in buildings do not occur. Airborne infection probably originates from other infected animals which may be clinically normal but in direct contact with the group in question. There is also the possibility that calves are infected by their dams, the infection remaining quiescent until predisposing conditions arise.

What does an outbreak look like?

Calf pneumonia is most prevalent between six weeks and six months old, but it can occur at any age. The first sign of pneumonia noted by the stockman is rapid breathing in a bunch of calves. This is accompanied by coughing. The coughing in any particular calf is not frequent but the group as a whole will often cough continuously. A number of calves will develop dirty noses after a day or two and perhaps 'runny' eyes as well. They remain alert, appetite is good and temperature normal. The trouble may last for two to four weeks and clear up on its own under good conditions.

Unfortunately many calves are reared under unsuitable conditions and in these circumstances up to 20 per cent, or even more, may become affected with an acute pneumonia. The onset of this form of the disease is sudden, the calf becomes listless and goes off its food. Breathing becomes much more rapid and is often laboured. The calf stands with its head straight out and at the end of each expiration there is a grunt. Constipation is common and the temperature is high. Secondary bacterial infection, if not present, may quickly become established. Half or more of these acute cases may die, but usually the mortality is much less. Death may take from one to three days. Prompt veterinary attention is of paramount importance in such cases, and a good stockman who can spot the calf about to develop the acute disease is of great help, because the earlier treatment can be given the better will be the chances of recovery. A proportion of recovered animals do not thrive and some may have to be culled.

How can we control it?

Prompt veterinary attention is required in all cases of acute pneumonia. There is no antibiotic yet discovered which can kill virus but some do kill Mycoplasma. Antibiotics are used primarily to eliminate secondary bacteria leaving the body's defence mechanism to deal with the other micro-organisms. The drug used by the Veterinary Surgeon will be decided by his knowledge of the resistence to antibiotics on any particular farm.

Oxygen is very useful in relieving respiratory distress but practical difficulties of administration on the farm often prohibit its use. If the animal can be conveniently put in a pen on its own and 'rugged up', this should be done. Don't forget that a warm drink will probably be welcomed by the calf.

The control of pneumonia must be based on limiting the spread of airborne infection by good housing and improving the general resistance to disease by good food. The prevention of scours is indirectly important in the control of respiratory disease because the scouring calf is much more susceptible to other infections. All the usual hygienic measures of feeding should be taken during the first weeks of life. The calf should always have colostrum, and good quality milk substitute should always be fed. If calves are being naturally reared bear in mind that the quality of cows' milk varies with the time of

year. The vitamin A content of a cow's milk is likely to be low in early spring, particularly if no green food has been available to her during the winter. Fortunately, vitamin supplementation of a calf diet is relatively easy these days. Adequate vitamin A is especially important in older calves in helping to prevent respiratory disease. The vitamin is important in maintaining the health of the linings of the respiratory tract. Four million units of vitamin A per ton of food is the usual level, but experience suggests that higher levels than this, particularly in barley beef systems, are beneficial.

Ideally, young calves should be housed in small numbers, say 8–12, so that the stockman can give them individual attention. Pens should be dry, well ventilated but not draughty. The temperature depends on the type of calf-house, but less than 50°F is not good. Fluctuations in temperature must be avoided.

Groups of calves of different ages should not be mixed. The practice of having all animals of three to twelve months in groups in one large building is conducive to widespread dissemination of respiratory infection. Good ventilation is particularly important in such buildings. Least trouble from respiratory disease occurs when animals are in open yards with suitable shelters.

Unfortunately, there are no vaccines against calf pneumonia which are effective in all circumstances. Blood from older animals in the same building can, however, be injected into younger animals when they reach the susceptible period. This blood will contain antibodies to the infections prevalent in the building, and the technique is being used regularly in some intensive rearing units.

Control of pneumonia is fundamentally based on limiting the spread of airborne infection and ensuring that calves are able to resist infection by being well fed. Drugs have their place but are complementary to, and not a substitute for, good housing, whether it is controlled environment or open yard system.

David A. Kinch, B.A., B.V.M.S., M.R.C.V.S., is an Assistant Veterinary Investigation Officer at the Ministry's Veterinary Investigation Centre, Cambridge. Before joining the Ministry he spent 3½ years in general practice in East Anglia and did a year's post-graduate study in pathology at Cambridge, as well as some research on allergic phenomena.

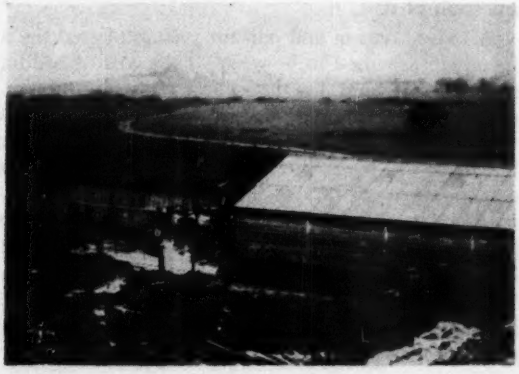
When the Walker Bros. dairy-retail milk farm on the outskirts of Manchester was lost to housing needs, they took over a

DERELICT FARM

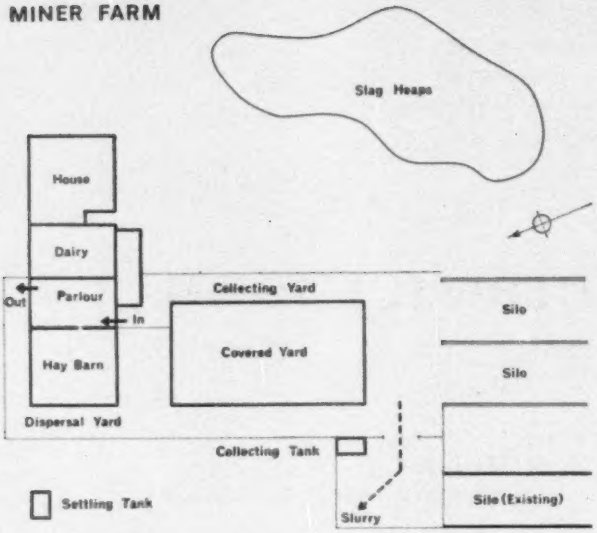
THE STORY OF ITS RE-EQUIPMENT IS TOLD BY

J. M. Kindell

WHEN, four years ago, Walker Bros. took over the tenancy of Miner Farm, a holding of 140 acres in N.E. Cheshire, owned by a local brick company, it was a depressing sight. It had the same kind of atmosphere as many a Midland area exploited by the Industrial Revolution—waste land, slag heaps, and general agricultural decay. At one time a small coal seam had been worked on the farm, resulting in a succession of slag heaps overlooking the homestead, and provided an apt name for the farm. Much of the land was overgrown and rank, and considerably trespassed. Gates were missing or broken and the hedges far from stockproof. The fixed equipment consisted of a substantial farmhouse, a cross-tie cowhouse of the traditional Cheshire type, together with a hay barn and some derelict outbuildings.



Part of the farm, showing the covered yard and silos in the foreground



But out of this, two hopeful points emerged. The land was inherently good and thus capable of improvement and well suited by situation and elevation to dairying; secondly, the owners of the farm were willing to re-equip it, and had agreed to be guided by their new tenants in the choice of layout.

Cowshed or parlour?

It was visualized that eventually the farm should support a herd of 70 milkers, with a view to selling the milk retail. Choice of system was guided mainly by three factors: (1) a system was wanted which had an element of flexibility, for it could be expected over a period of time that the farm acreage would vary both up and down following brickearth extraction and restoration; (2) the new tenants were silage enthusiasts and required a system which would eliminate cutting and carting silage to stock; (3) not least important was the question of cost.

A loose-housing and parlour system offered the answer, although, against its advantages had to be weighed the cost of bedding material, which would have to be bought. On the other hand, the land had received little in the way of either farmyard manure or artificials for many years, and therefore there would be an assured outlet for farmyard manure as the policy of land improvement progressed. I could also be expected that a parlour system might be provided more cheaply than that of a cowhouse, since the parlour could be sited in the existing building. This and personal preference dictated the final choice of system, and in consultation with A.L.S. and N.A.A.S. a final plan was agreed.

The accommodation consisted of a covered yard 75 ft × 40 ft (allowing a bedded area of approximately 40 sq. ft per cow on the basis of 70 cows) of conventional concrete Portal frame construction, erected by a specialist

contractor. Sliding doors were placed in each gable wall which, together with the side walls, were built up in 9-inch concrete blocks, two blocks short of eaves level, in order to assist ventilation. Because of the heavy clay subsoil and to facilitate cleaning out with a fore-end loader, the interior of the yard was concreted. Outside areas were also concreted to form collecting and dispersal yards and to give access to silos.

The existing cowhouse was converted to form a four-point tandem parlour with a dairy large enough to take the paraphernalia required for milk bottling and the washing-up facilities for the parlour equipment. Two open silos were built with concrete bases and slab side walls, with a total capacity of approximately 400 tons. Cost of the building work amounted to £5,400, on which farm improvement grant was obtained, less the cost of the silos. As had been anticipated, the total gross cost worked out at considerably less than a cowshed to house a similar number of cows.

Theories into practice

At the time of writing, 60 acres of land have been reseeded and the farm stocked with 40 dehorned Ayrshire-cross cows and also 10 Channel Island cows to meet a specialized market which is being built up.

The health of the stock has been exceptionally good, attributed to the fact that the yard is dry and free from condensation, despite the fact that the ridge is a closed one. The side walling has now been taken up to eaves level, because in the early days draughts were troublesome; ventilation of farm buildings can be planned at the design stage, but it does not always work out in practice! Early fears that the cows might suffer unduly from exposure to cold winds were happily not realized, as some measure of protection is given by the house and the slag heaps.

Walker Bros. are pleased with the tandem parlour. The greater individual attention which can be given to the cows adequately offsets the faster milking time which might be achieved in other types of parlour. Milking is carried out by one man, who also undertakes bedding and other chores with some assistance during weekdays. Twenty-four-hour self-feeding is practised, using a movable electric fence, and the combined width of the two silos allows approximately 9 inches of feed space per cow; this is based on the total number of cows which can be housed in the covered yard. The silos are

One of the open silos, showing access from the covered yard. The collecting yard is on the right, the parlour and dairy at the back

covered with polythene sheeting, and so far the dry matter content of the silage has been satisfactory. Some lowering of milk yield was expected during bad weather, but this has not proved serious.

Future modifications

The new buildings have been in use for two years now, and Walker Bros. are thinking of some modifications in the light of experience. As cow numbers increase it may be necessary to extend the silos, and if this were done they would like to construct a ramp to ease off-loading the grass. For the time being some use has been made of an old silo to give extra silage capacity. Roofing the silos could also improve silage quality and provide extra storage space, but at this stage of the farm's development they doubt whether the cost would be justified. But prompted by the continued high cost of bedding straw, they feel that the installation of cubicles would be a practicable alternative.

J. M. Kindell, A.R.I.C.S., A.A.I., is an Assistant Land Commissioner in the Ministry's Agricultural Land Service, and is stationed at Crewe, Cheshire.

Sir Harold Sanders

Sir Harold Sanders, M.A., Ph.D., retired from the post of Chief Scientific Adviser (Agriculture) to the Ministry of Agriculture, Fisheries and Food, on 31st July. He is now to serve on the University Grants Committee as Deputy Chairman.

Sir Harold was a member of the University Grants Committee from 1949 to 1955, while holding the Chair of Agriculture at the University of Reading, but this is a new appointment made in accordance with the Government's policy of strengthening the staffing and structure of the University Grants Committee, in view of the additional burdens falling upon it.

Stand back

and look at

BARLEY

BEEF

The production of barley beef has caught on quickly. Is it good business for the farmer? Is it acceptable to the consumer? The author believes the answer to both questions is YES

Tom Tweddle

DISCUSSION of the merits and de-merits of barley beef has waxed and waned over the past three years. From trial packets of 10–12, expansion to units of a thousand head has been swift. But perhaps the time has now come to stand back and look at this modern enterprise, to examine its progress and weigh its possibilities.

That barley beef has brought precision to beef production cannot be denied, and the system has given a degree of control to the producer which hitherto was almost non-existent. Financial success depends on getting the right answer to the balance of three main factors: the cost of the calf plus the total cost of food consumed, set against the returns of selling price and subsidy.

The right calves

Continuity of supply of the right type of calves at reasonable prices is the key to the success of this enterprise. If we need evidence of this we have only to look at the growth of calf 'banks' and the increasing number of contracts between them and the feeders. Originally the system was based on the plentiful supply of Friesian bull calves, which were then cheap. But demand has now pushed up their price. Fortunately, the field of selection is widening to include beef crosses, pure beef and even pure dairy steers where the original price is low enough.

The fears and horrors of bloat of the early days have been replaced by the hazards of respiratory and other diseases at the calf stage. But controlled environment in calf pens, high standards of hygiene and strict veterinary measures are making progress in this field.

Variations from the original all-concentrate diets now include an almost standard 2 lb of hay per head per day. High-moisture grain is being used with some success, and this may well be the answer to fluctuating barley costs.

Early enterprises in barley beef were based on selling at peak prices in the spring—understandable when the difference in standard price could mean a difference of £16 per head in return. This may well have been the intent, but a N.A.A.S. survey showed a spread of selling age of from 9½ to 16 months. Supplies of barley beef are now coming on to the market fairly evenly throughout the year and the bigger units are contracting to give level delivery.

Housewives' choice

What has barley beef provided for the consumer? Small joints of lean, tender meat with the minimum of a white fat; all of these are important to the housewife in the large urban areas. More important still is the element of repeatability. Having made a market and created a demand for this sort of meat, then this market must be serviced and the demand met. Continuity of supply of beef of a standard weight and quality is essential, and this can best be done by barley beef systems. White fat (a most important selling point) can only be produced under such a system. Grass in any quantity, whether grazed *in situ* or fed in zero grazing, brings a yellow fat—to which there is some sales resistance.

It has to be admitted, however, that in one respect barley beef is sadly lacking—flavour. Jokes about pass the mint sauce or red-currant jelly abound; but surely taste and flavour are very much matters for the individual. After all, even with the best traditional beef some of us insist on mustard, some on horse-radish, while others prefer some kind of sauce out of a bottle. Perhaps the subject of flavour is best left in the province of the cook, leaving us to emphasize the merits of leanness, tenderness and repeatability.

For the butcher, barley beef usually offers an animal with a high killing-out percentage, a carcass of minimum waste. These points, together with repeatability, are all desirable. On the other hand, there appears to be a fairly high loss of carcass weight from shrinkage, and generally the meat from barley beef is best suited to a quick selling trade. It tends to look 'tired' more quickly than traditional beef. Often, too, it lacks colour in the lean.

On balance, I think it fair to say that the end product suits the majority of consumers and that so long as butchers can be assured of continuing supply of a standard product this trade will grow. Ideally both sides of the industry would prefer some form of long-term contract. This is difficult to achieve so long as Fatstock Guarantee Payments form such a large and variable part of the return to the producer. Contracts based on price between the two sides, with the producer taking the F.G.P. is the only foreseeable possibility.

Production techniques improve rapidly at the later stages of fattening, but much work needs to be done at the calf stage. All these improvements will help profitability, and so far on average they have been satisfactory. From twenty cattle to some half million in three years is proof enough of the popularity of the system and basically, if this production method cannot be profitable where advantage is being taken of all the important factors in

production, then other systems of beef production are in an even worse plight, unless they are based on cheap stores or someone else's losses.

Future prospects bright

Future prospects must be bright for barley beef. Slaughtering of clean cattle during 1963 amounted to around 2,763,000 of which about 520,000 would be Irish imports. Growth in population and per capita consumption, together with a reduction in carcass weight, could raise this demand to well over three million head of clean cattle by 1970. Even with increased Irish supplies, this could mean over 2½ million clean cattle per year from the home breeding herd (about 4¼ million cows).

Every calf with potential must be reared, and reared well, if this is to be achieved. In a time of integration and the development of larger and larger units, it is a comforting thought that 'they cannot go without calves'. The small producer, with his specialist knowledge and flair for the detail of successful calf rearing (and the best 'man' is often a woman), may well hold the key to success at all stages of barley beef and so be assured of a fair slice of the cake.

Technically, barley beef has arrived; changes in future methods of production will probably be concerned mainly with improved housing and trials to cheapen feed costs. The development of large groups, integrated from the calf stage to slaughter, can only lead to better, more orderly marketing to the ultimate benefit of all concerned. The basic lessons of the original work on barley beef must continue to be true. Given an animal of good growth potential, feed it on a system which allows it to express that potential in the shortest possible time.

The author, who will be well known to many farmers, is the N.A.A.S. Regional Livestock Husbandry Officer for the West Midland Region. He was born in Co. Durham, the son of a farmer/butcher. Before the war he was in partnership with his father, but on demobilization went as manager of several farms in Aberdeenshire. He joined the N.A.A.S. in 1949.

Four New Appointments

MR. ARTHUR JONES, M.A., B.Sc., B.Litt., Chief Farm Management Adviser in the Ministry of Agriculture, retired on 31st July. He is being succeeded by Mr. A. J. DAVIES, B.Sc., formerly Director of the S. W. Region of the N.A.A.S.

MR. W. P. DODGSON, O.B.E., the Ministry's Chief Livestock Husbandry Officer, also retired on 31st July. He has been succeeded by MR. T. ALLSOP, formerly Deputy Chief Livestock Husbandry Officer.

DR. E. K. WOODFORD, O.B.E., Director of the Weed Research Organisation, Oxford, succeeds DR. WILLIAM DAVIES as Director of the Grassland Research Institute, Hurley, on 1st October.

Mr. J. D. FRYER, M.A., becomes Director of the Weed Research Organisation on the same date.

Research Spot

Housing Dairy Cows

Straw, sawdust and slats

IF dairy cows are to be housed during the winter months—and most of them are these days—a great deal of straw is necessary to keep udders and flanks clean. In fully-covered yards, allowing, say, 80 sq. ft per cow, some 20–30 cwt of straw per beast has often been needed; this compares with 5–10 cwt in cowsheds. And added to this there is the question of accumulated dung.

At the NIRD a measure of straw usage was made over 140 days in a fully-covered yard using two groups, each of sixteen cows. Relatively long, narrow bedded areas were divided from the concrete loafing/feeding areas by a 10-inch high curb. Each cow had an area of 65 sq. ft, of which half was bedded with straw.

Twenty-five pounds of clean straw were spread in each bedded area to start with. Then a weighed quantity of clean straw was added each day, varying from 1 lb to 10 lb per cow according to need. The total amounts of straw used were 4½ cwt per cow with a 10 ft-wide bedded area, and 5¼ cwt per cow with a 15 ft-wide bedded area. The depth of the dung pack at the end of the period did not exceed 18 inches. The concrete area was scraped clean once a day.

Sawdust

Sawdust is an excellent bedding material for dairy cows and can be used most economically in individual cubicles or resting stalls. Each cubicle provides a resting area of 6 ft 9 in. × 3 ft 9 in., which is raised 6 in. above the level of the 8–10 ft-wide access passage between rows of cubicles. The floor of each stall is littered to a depth of 2–3 in. with sawdust, which is contained by a 3-in. kerb at the rear of the stalls.

In trials at the Institute with ten cows, the bedding was rarely fouled and with additions of clean bedding two or three times each week, total amount of sawdust used in a period of 70 days was 1¼ cwt per cow.

Slatted floors

In an experiment with slatted floors at the Institute, twenty dairy cows were kept on a slatted floor 45 ft × 20 ft for 150 days. The slats of 5 × 2½ in. Keruing hardwood were spaced at 1¼ in. intervals and made up in panels 7 ft 6 in. long by approximately 2 ft wide. The cows appeared to be comfortable and spent on average 9¼ hours a day lying down, compared with an average of 10¾ hours a day by cows in a strawed yard, and no injuries occurred to their teats or limbs.

No litter was used on the slatted floor, and on average the udders of six of the cows were found to be dirty at every milking. This is an obvious disadvantage of completely slatted floors, extra time having to be spent on washing in the milking parlour where it can be ill afforded.

In view of the success achieved with individual cubicles, it is unlikely, says the Institute, that completely slatted floors will be used in future for dairy cows; but a combination of cubicles with slatted passages would be worth while where cows are fed at mangers on the slatted floor.

In non-arable areas it is certain that individual cubicles with solid or slatted floors will become the main form of loose-housing for dairy cows. On arable farms, where there is a need for dung with straw for crop production, correctly-shaped communal lying areas bedded with straw will be economical and provide reasonable conditions for dairy cows.

In an experiment at the N.I.R.D. to measure straw usage, cows were bedded on straw in long, narrow areas, divided from the adjacent concrete loafing/feeding areas by a 10-inch high curb

The 1963 report of the National Institute for Research in Dairying can be obtained from the Secretary, price 7s. 6d.
Address: Shinfield, Berks

GUN LAW

- **Licences and Certificates**
- **Shooting Rights**

G. F. Aronson, of the Legal Department of the Ministry of Agriculture, considers some legal problems to do with shooting

IT is a sound axiom to keep on the right side of the law at all times, and this is especially true when dealing with any object which is lethal. With the possible exception of the internal combustion engine, there is no object which a farmer is likely to handle more lethal than a firearm. What are the points therefore he should watch to prevent his falling foul of the law?

First of all, let us be clear about when one needs a gun licence and a firearms certificate. Why is it necessary in certain circumstances to have both a licence and a certificate, and in others neither document is necessary? Why cannot one document do the work of two? The reason is that the Gun Licence Act 1870 is a purely revenue raising measure. The Act applies to a firearm of any description and an air gun or any other kind of gun from which any shot, bullet or other missile can be discharged—which just about includes every kind of weapon one can think of, including even an atomic missile!

There are, however, a number of exceptions created by the 1870 Act to the rule that a gun licence is always necessary. Of these perhaps the most important is that relating to the occupier of land who uses or carries a gun for the sole purpose of scaring birds or killing vermin. Another important exception arises in the case of the holder of a game licence (see below). Incidentally, the offence under the Act is 'using or carrying a gun elsewhere than in a dwelling-house or the curtilage thereof' (i.e., the garden or orchard attached to a house). The effect of these provisions may very broadly be said to be

that if you keep a gun but never use it, or use it only for scaring birds or keeping vermin down on your land you do not need a gun licence. But, on the other hand, if you take it off your land, whatever kind of gun it is, you must have a licence and you must pay the proper charge (10*s.* a year). An excise penalty of £10 is payable on conviction of using or carrying a gun without a licence when one is necessary.

Firearms certificate

Not to have a firearms certificate when one should is a much more serious matter, because here one really does come up against the criminal law. The Firearms Act 1937 provides that, with certain exceptions, no person shall purchase, acquire or have in his possession any firearm or ammunition unless he holds a firearms certificate in force at the time. Certificates are granted by the police and may be withheld where public safety is involved. Infringement of this Act can carry with it a fine of £50 or imprisonment up to three months.

However, it is reassuring to note that the definition of 'firearm' does not include 'a smooth bore gun having a barrel not less than 20 inches in length'; nor does it include air guns, air rifles or air pistols, unless of a type which the Home Office have declared by rules to be especially dangerous. So, if you use the ordinary long-barrel shot gun or air rifle, you do not need a firearms certificate but only a gun licence. If, moreover, you use such a weapon on your own land for frightening birds or disposing of vermin, you are in the happy position of needing neither a licence nor a certificate.

As mentioned above, in cases where a gun licence would otherwise be necessary, the owner of the gun is exempt if he has in force a game licence. (Yes, I am afraid this is yet another piece of paper you may sometimes need!)

When is a game licence required? For the answer to this question we have to probe a little further back in history to the Game Act 1831. This provides that as a general rule a person must hold a game licence before he can take or kill 'game', whether by shooting or in any other manner. The offence of killing game without a licence is punishable on conviction before the justices by a fine of up to £5. The expression 'game' is defined in the 1831 Act as including 'hares, pheasants, partridges, grouse, heath or moor-game and black game'. Yet another Act, the Game Licences Act 1860, makes a game licence necessary for killing 'any woodcock, snipe, rabbit or deer' (as well as the game defined under the 1831 Act), and on conviction under the 1860 Act an excise penalty of £20 may be recovered summarily. In other words, the objective of the 1860 Act is, like that of the Gun Licence Act 1870, to raise revenue.

Once again, we have the usual list of exceptions when a game licence is not necessary, of which the most important is that a licence is not required for the purpose of killing hares or rabbits on land in one's own occupation. But, generally speaking, if you shoot other kinds of game on your land or if you expect to be invited by a neighbour to shoot game of any kind on his land, you will (unless he also takes part in the shoot and has a game licence) need a game licence, even though you already have a gun licence. But, as already stated, the converse does not apply, so if you already have a game licence you do not need to bother about a gun licence. A game licence costs £3 for a full year.

Shooting rights—landlord and tenant

Let us now turn from these antiquated and involved nineteenth century Acts of Parliament—all badly in need of a spring clean—and consider a few general principles of common law, which, as is so often refreshingly the case, turns out to be just another way of saying common sense. Obviously you cannot go round shooting merely because you have a licence or are exempted from taking one out. Rights of property have to be reckoned with, and one must make quite certain that one is not infringing anyone else's rights.

To take the simple case first of all of the owner-occupier, he may shoot not only wild game and game specially raised on his land; there is nothing in law to prevent him from shooting birds flying over his land, even if he knows they have been specially raised by a neighbour—although it does not generally make for good feeling to tempt one's neighbour's pheasants on to one's own land by scattering corn! Nevertheless it is perfectly lawful to do so. To take a less simple case, if a landowner grants a tenancy of his land to a tenant-occupier, the right to shoot over the land will depend on the terms of the tenancy. If nothing is said in the tenancy agreement, the shooting rights will automatically pass to the tenant, but if the shooting rights are valuable the probability is that the landlord will have reserved them either for his own use or for the use of a shooting-tenant. An occupying owner or tenant who infringes the rights of the shooting-tenant by pursuing, killing or taking game is not only liable in damages; he may even be prosecuted under section 12 of the Game Act 1831—although such prosecutions today are almost unknown.

Where the shooting rights have been reserved by the landlord either for himself or a shooting-tenant, what rights has the tenant-occupier over the land? One right he has without any qualification whatever. The Ground Game Act 1880 lays it down that every occupier of land has, as incident to and inseparable from his occupation of the land, the right to kill and take ground game—which is defined as meaning 'hares and rabbits'. This does not mean that no one else may shoot ground game as well, but it does mean that the occupier may not be deprived of *his* right to do so. If the occupier does not wish to exercise this right personally, he may authorize in writing one other person to do so on his behalf, who must be either a member of his household or an employee, or someone specially employed by him to destroy ground game. A tenant, by the way, may not shoot ground game by night.

When there is a shooting tenancy, the tenant-occupier is entitled to make normal use of the land and he may even destroy furze and underwood, but he must not deliberately drive the game away. The landlord or shooting-tenant for his part must exercise his shooting rights with reasonable consideration for the occupier, which means that he must not trample fields of standing crops at a time when it is not reasonable or usual to do so; and it has been held that if the owner or shooting-tenant causes game to increase to an unreasonable extent, the tenant can recover damages for injury to his crops. It would, however, probably need to be an extreme case before this situation could arise. Moreover, section 14 of the Agricultural Holdings Act 1948 gives a tenant-occupier in certain circumstances a right to claim statutory compensation. Before he can do so he must show that the damage he has suffered exceeds one shilling for every acre of land over which the damage extends.

This rules out trivial claims. To qualify for such compensation, the tenant must give his landlord written notice of the damage within one month after

the time when he discovered (or ought to have discovered) its existence and also give the landlord an opportunity to inspect the damage; and he must follow up the first notice with a second notice, served before the 31st January of the following year containing full particulars of the claim. Disputed claims, if they cannot be settled, go to arbitration. If a landlord, paying out statutory compensation, has previously granted a shooting tenancy to some other person, he may look to that person to indemnify him for the compensation he has had to pay.

Next month Mr. Aronson will have something to say on the subject of liability for accidents caused by firearms

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The Ministry's Publications

Since the list published in the July, 1964, issue of *Agriculture* (p. 328) the following publications have been issued.

BULLETINS

No. 148. Incubation and Hatchery Practice (Revised) 6*s.* 6*d.* (by post 6*s.* 11*d.*)

Describes new developments in the design and construction of hatcheries and advises on the nutrition of breeding stock. Ways of reducing disease risks are also discussed, as well as the problems that arise in hatchery management.

ADVISORY LEAFLETS

No. 450. Perennial Bindweeds (Revised)

No. 528. Common Chickweed (New)

No. 529. Corn Marigolds (New)

FARM MACHINERY LEAFLETS

No. 2. Binders (Revised) 6*d.* (by post 9*d.*)

OTHER PUBLICATIONS

Laxton: A Guide (New) 3*s.* 6*d.* (by post 3*s.* 11*d.*)
(See 'In Brief' note p. 392)

Report of the Departmental Committee of Inquiry into Recruitment for the Veterinary Profession (Cmnd. 2430) (New) 4*s.* 6*d.* (by post 4*s.* 11*d.*)

A completely new list of all the Ministry's Publications has just been published. This is Sectional List No. 1, and can be obtained free from the address below, any office of the Ministry or Government Bookshops.

Single copies of Advisory Leaflets, up to a maximum of six different leaflets, may be obtained free from the Ministry (Publications), Government Buildings, Tolcarne Drive, Pinner, Middlesex. Copies beyond this limit must be bought from Government Bookshops (addresses on p. 396), price 4d. each (by post 7d.). Other publications are obtainable from Government Bookshops, from Divisional Offices of the Ministry or through any bookseller.

POTATO HARVESTER AT WORK IN HUNTINGDON

Potato Diggers and Harvesters

CHOICE of equipment for potato harvesting must depend in part upon soil conditions. Spinners can work in a wider range of conditions than elevator diggers, but in dry, light soil elevator diggers can save labour costs because the potatoes are left in a more compact band for the pickers. Where a complete harvester will work, the number of man-hours needed per acre can be reduced still further, but there may be no reduction in the 'non-picking' labour.

If damage to tubers is to be prevented, all types of machine must be run reasonably slowly and they must be set accurately. With a spinner the point of the share must be in line with the centre of the ridge. If necessary the tractor wheel track must be adjusted. The share should be set so that the rear edge is at the same level as the points of the digging tines. In very wet, sticky conditions a gap of 1–2 inches should be left between the rear edge of the share and the tines to help break up the ridge.

Tubers will be damaged if the tines are not set with their points below the level of the back of the share. If the share is too low, so much soil will be dug that the potatoes will be buried; if it is too high some potatoes will be sliced and spoiled. Excessive speed of rotation of spinner-tines will cause bruising. Speed should be just high enough to throw the potatoes clear of the soil.

With an elevator digger, if the share is set too deep, excessive quantities of soil will pass over the web and the potatoes will still be under soil after the machine has passed.

The adjustment of the machine must be related to the type of soil and its moisture content. In general, a machine that is adjusted for the most complete separation of potatoes from soil does the greatest amount of damage to the potatoes, because soil acts as a cushion and saves potatoes from impact. The quantity of soil carried with the potatoes in an elevator digger varies with the speed of the web, the amount of agitation and the condition of the soil. In some sticky conditions severe shaking may be needed to separate potatoes from the soil, but agitators that were needed when the soil was damp must not be left in position unnecessarily in drier conditions, otherwise some tubers will be damaged. If the digger has a web that can be set to run either in one length or in two separate lengths, then only in damp, heavy soil conditions should the web be run in two parts with a drop from one to the other.

A reasonably high forward speed of an elevator digger and, indeed, of a complete harvester, does not always cause a great amount of damage to the potatoes. In some light soils a high forward speed brings less damage than a slow speed because, with the high rate of work, enough soil is retained to provide protection for the potatoes being carried with it.

Potato harvesting implements need adjustment almost continually during work. For example, the speed of the web in relation to the forward travel speed of an elevator digger may need to be changed, and so may the severity of agitation imparted by the rollers. Ease of adjustment in these matters is a great asset in a potato harvesting machine.

The setting of the shares on all kinds of potato harvesting implements needs to be watched from hour to hour as the work proceeds. Just as changes in soil condition may alter the need for agitation, so changes in the depth to which the crop has grown may alter the setting of share needed; differences may occur even within the same field.

When a complete harvester is being used and the crop is being loaded into a trailer drawn alongside the machine, the drop into the trailer must be kept as short as possible by use of the adjustment for the delivery height of the elevator, and this adjustment must follow quite closely the rising level of potatoes in the trailer.

With a spinner in use, if the potatoes are lightly skinned or have shallow cuts, it is likely that the ends of the rods are striking them and the distance between share and rods must be changed; deep dents in the potatoes show that the rod speed is too high. When an elevator digger or a complete harvester is being used, skinning and 'impact stars' may both be due to too high a web speed.

H. JORDAN HINE — M. JAMIESON
N.A.A.S. Farm Mechanization
Cambridge — Leeds

19. Gower, Glamorgan

C. F. Blunt

JUTTING out into the Bristol Channel from West Glamorgan, the Gower Peninsula resembles a miniature Pembrokeshire, with its rocky and wind-swept southern coastline dotted with numerous delightful sandy bays, well suited to the holidaymaker. The cliffs abound in caves, which are now the haunt of the pot-holer, but which surely must have been used by the smugglers and wreckers of bygone days.

In sharp contrast, the north-western side is separated from the Carmarthen coast by the estuary of the river Loughor, giving rise to marsh and tidal mud flats more suited to the wild-fowler and noted for the cockle pickers of Penclawdd. These marshes do however, play an important part in agriculture, since they carry hundreds of sheep for the greater part of the year, the ewes only being brought up on to higher land for lambing and in periods of very high tides.

Apart from pockets of Old Red Sandstone, the soils are derived mainly from carboniferous limestone, with the lighter and easier working soils chiefly in the south. There are a few wet or rushy fields, and as one moves northwards these poorly-drained areas appear more frequently. This is especially so where the limestone eventually gives way to the coal measures crossing the neck of the Peninsula.

Much of the higher ground is common land, and indeed common grazings are to be found throughout, amounting to over a quarter of the total area. One of the largest, Cefn Bryn, dominates the centre of Gower, and from the summit, at just over 600 ft, an excellent view can be enjoyed of the whole coastline. All this land is mainly grazed by Welsh Cross sheep, but beef cattle, ponies and even a few dairy herds are also free to roam at will.

Stretches of the coast have been taken over by the National Trust, and local societies have made great efforts to preserve the natural beauty of the area. The countryside is, therefore, still unspoilt. There is a strange lack of hotels, and only a limited number of caravan sites tucked away discreetly in secluded spots. At week-ends the district acts as a magnet to the people

from the industrial area surrounding the nearby towns of Swansea and Port Talbot. Gower is, therefore, able to sell produce locally to holidaymakers, it has a large market at its doorstep, and yet is far enough away not to suffer greatly from trespass.

With the sea bordering so much of the district, and the consequent favourable climate, it is not surprising that a market garden system has been evolved, with the emphasis on early potatoes. Nearer Swansea, there is a specialized market garden pocket around Bishopston. The holdings are mostly very small and small plots of flowers are also grown. A special area in the southernmost tip of Gower is worthy of note, as it appears to be farmed on the old manorial system. Nearly 200 acres of land are divided into small strips, mostly little more than half-an-acre in size and hardly any above four acres. Apart from one or two stone walls, the area is completely unfenced and there is very little to distinguish one plot from another. This land has naturally been arable for many years, with only an occasional break of one-year ley for hay, and most plots are in cabbage, cauliflower, potatoes or corn.

The bulk of the early potatoes are concentrated in South Gower. Lifting has normally started by the first week in June and broccoli or autumn cabbage are then planted. Where the farm has a dairy herd, kale or Italian ryegrass follow the earlies, but many of the farms are content to carry beef and sheep. One disadvantage of the proximity of large towns is that good regular labour is hard to come by because of the competition from industry, but casual labour is obtainable if properly organized.

Further inland and to the north, small dairy farms are much more in evidence, although sheep are scattered throughout the district. These farms often grow a small acreage of corn, and a few fields are still cut with the binder. In addition to kale, mangolds and swedes are grown for feeding, but boron deficiency is extremely common, although most farmers have overcome this by using compound fertilizer containing boron. Pigs are not often seen, but a handful of farmers have increased their output considerably by installing battery cages for a few thousand laying hens.

By Welsh standards, the rainfall is not high, being well under 40 inches in the extreme south, but increasing as one comes north to Swansea. In spite of this, Gower has always been considered mainly as a livestock area and only small areas of corn have been grown for feeding to cattle on the farm. Yet the district seems particularly suited to corn growing as yields are high, 35–40 cwts of barley per acre being by no means uncommon. With the advent of the combine harvester, the wet harvests which plague farmers here can be overcome and cereal growing is increasing considerably. A limited acreage of winter wheat is now appearing, but until recently virtually all corn was spring sown, being mainly Rika barley with a little spring wheat, mixed corn and oats, of which Black Supreme is still the most popular variety.

The increase in the corn acreage is largely at the expense of cabbage, cauliflower and maincrop potatoes. The decrease in the acreage of maincrop potatoes has probably been due to the effects of blight, which starts early in South Gower, but the decline in cabbage and cauliflower (only small) is a result of the increasing cost of labour and the rather lower returns of recent years. It seems quite possible that this hint of a trend towards a more simple system of farming may become more marked, but time will tell.

FROM THE ALS

R. B. SAYCE
Agricultural Land Service, Oxford

Simple Slurry Collection

IN designing modern buildings for intensive housing of livestock, the most intractable problem is often the collection and disposal of muck without straw. With slatted floors, collection tanks, pumping systems and organic irrigation by pipeline, the solution can be very expensive. Two much cheaper and simpler ways are to tractor scrape the slurry to a storage apron, which resembles a wide middenstead, or to a muck trailer standing in a bay.

In both methods the area to be scraped should be designed to make the job quick and efficient. Straight runs with no corners or projections for the scraper are essential. There should be curbs about 9 inches high to contain the slurry where there are no walls or solid mangers at the edge of the feeding and loafing areas. The concrete should be laid level to prevent liquid running off and leaving solids to harden, and the surface tamped so that animals will not slip. No drains are required if the areas are under cover. There should be entry and exit for tractors at both ends of the straight runs. These features must be worked in at the design stage.

The storage apron

If the slurry is to be scraped to a storage apron at the end of the area, this should be constructed of concrete and be of a size sufficient to contain several months' production. A wall is usually necessary on three sides to contain the muck; it need be no more than about 4 ft high, with the open side opposite the exit from the scraped area. Ideally it should be covered, particularly in districts where the rainfall is high, but this is expensive. If straw is added to create a 'muck sandwich', the floor can be dead level; otherwise it should have a good fall (1 in 40) to the front or back. If the fall is to the front, an open shallow channel will take liquids to a small collection tank at the side; if to the back, a baffled opening in the wall allows the liquid to be collected in a tank outside the wall. But draining off the liquid is not absolutely essential if some straw is used, and this saves the cost of the collection tank and ancillary equipment.

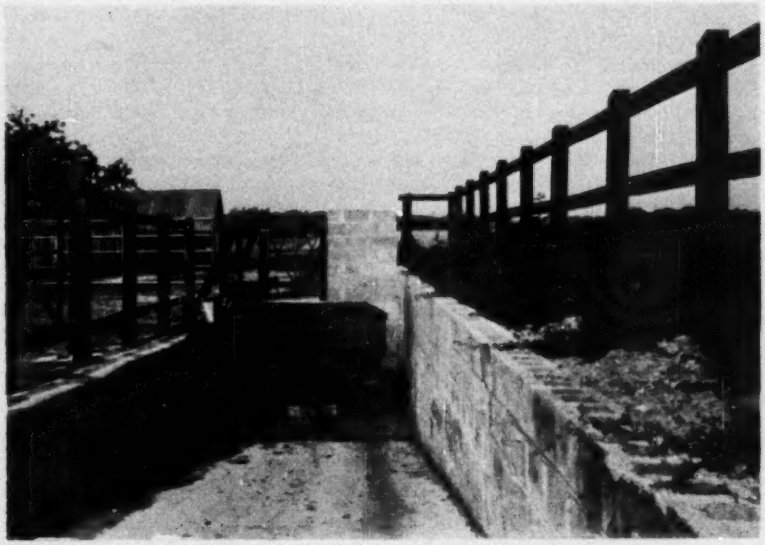
The trailer bay method

The other method which saves double handling is to scrape to a trailer standing in a bay: for the arable and mixed farm this is a cheap, simple method using existing machinery.

The photograph below shows a typical bay with the trailer in it. It is 4 ft 6 in. deep from ground level; 5 ft 3 in. to the underside of the overhanging ledge. The ledge is a steel plate on a cantilevered frame and projecting upwards to clear the trailer side. The bay is 7 ft 6 in. wide, and the slope into it about 1 in 4. The walls are of 9-inch concrete blocks, reinforced horizontally and vertically against side thrust of the earth.

An important feature is the oak post-and-rail fencing to keep stock out, and the heavy safety rail to prevent accidents. This safety rail is of rolled steel joists, with the posts set well into the ground on concrete foundations and raked back to allow the scraper blade to reach the edge of the ledge.

One final point: the bay can fill up with rainwater, so a drain must be provided. If the depth prevents a drain being constructed, a sump in one corner will allow the bay to be pumped out.



Cheap and simple—the trailer bay

IN BRIEF

Intensive Livestock

Professor F. W. Rogers Brambell, Head of the Department of Zoology at the University College of North Wales, has agreed to be Chairman of the Technical Committee which is to inquire into conditions in intensive systems of livestock husbandry.

The Committee's terms of reference will be 'To examine the conditions in which livestock are kept under systems of intensive husbandry and to advise whether standards ought to be set in the interests of their welfare, and if so what they should be'.

The Minister of Agriculture, Fisheries and Food announced the decision of the Secretary of State for Scotland and himself to set up this Committee, in replying to a question by Mr. Burden in the House of Commons on 20th April, 1964. In doing so, he said that the development of cheaper and more efficient methods of rearing livestock, which is such a marked feature of the changes occurring in farming practice, had brought with it very real benefits to consumers. At the same time the new methods, as they became increasingly widespread, raised the question whether standards should be laid down: the Ministers felt the need for an expert inquiry to advise on this.

The Committee includes experts working within the general field of the inquiry and lay members.

Risks in Glasshouses from TBA residues

One form of damage to tomatoes, cucumbers and dwarf beans under glass has been tracked down to the use of straw from cereals which had been sprayed with the herbicide TBA,2,3,6 trichlorbenzoic acid. This straw may have been used as bales, compost or manure.

The symptoms shown by tomatoes are distortion, in-rolling and cupping of the leaves. Seedling tomatoes show excessive distortion of the cotyledons, as well as extensive curling.

Cucumbers show similar symptoms of in-rolling of the leaves, and those developing from the tips of the shoots are narrow, cupped and of a pale green colour.

No commercial cases of TBA damage from straw have been reported for other glasshouse crops, such as lettuce and chrysanthemums, but they may not readily produce recognizable symptoms at the trace levels which damage tomatoes, cucumbers and beans.

When this type of damage occurs growers should first consider other possible sources of trouble, such as spray drift, accidental contamination with hormone-type chemicals or the presence of virus disease.

When it appears that TBA is the culprit in cucumber beds, straw bales, etc., the suspect material should be removed and disposed of, and not incorporated in soils which are to be used in the glasshouse. When soil has been contaminated it is best to grow the next crop in containers or on straw bales or beds isolated with polythene. Bringing in fresh soil to a depth of about 18 in. may be the most expedient way of dealing with a very small area of contamination.

New Grants for Horticulture

The Horticulture Improvement Scheme 1964 and the Small Horticultural Production Business Scheme 1964, which were laid before Parliament in draft on 13th May, have been approved and came into operation on 1st July. Explanatory leaflets and application forms may be obtained from any Divisional Office of the Ministry of Agriculture, in England or Wales, the Department of Agriculture in Scotland, and from the Ministry of Agriculture in Northern Ireland.

A number of changes in the standard costs which apply to the Horticulture Improvement Scheme are contained in regulations which also came into operation at the same time. These regulations make a number of important alterations and additions to the standard costs, which were last revised in 1963. The changes apply only to proposals approved for grant on or after 1st July, 1964. They include a complete revision of the standard costs for glasshouses, which will in future be based on the glazed area instead of the floor area. Standard costs are fixed for the first time for mushroom houses and rhubarb sheds. Apart from these changes, the 1963 standard costs are altered only in minor respects.

Applications may now be made for grants under Section 3 of the Agriculture and Horticulture Act 1964 of a third of the cost of clearing orchards. Any owner or occupier of agricultural land may apply. Explanatory leaflets and application forms are available, as above.

First Watercress Co-operative

'West Herts Watercress Growers Ltd.', the first horticultural co-operative organization designed specifically for watercress growers, has been formed by five watercress farmers who sponsored the initial investigation into the project. The organization will build a packhouse at Two Waters, Hemel Hempstead, to provide central grading and packing facilities, so releasing the members' skilled labour for the important task of improving and increasing production.

The main objectives of the company are to be high standards of service and produce which will satisfy the demands of a changing market and ensure the best possible net return to its members. Initially, the packhouse will provide a service only; the bulk of the watercress will be marketed individually by the growers. All watercress will be washed, prepared, packed and hydro-cooled and where necessary cold stored and then dispatched by the company. When the central services are working satisfactorily and better production, grading and packing have been achieved, the company will gradually assume control over the marketing.

Eventually the company will handle all produce grown by members; casual sales will not be allowed. The sponsors feel this to be fundamental in operating as a co-operative enterprise. It is hoped that the packhouse will be ready by October, 1964, and that the company will be fully operational by the following season, when the estimated throughput will be 60,000 chips. Mr. C. H. Burgess of Gatherley, Water

End, Hemel Hempstead, is the Chairman of the company, the formation of which has been assisted by A.C.C.A. Ltd., together with other consultants.

The sponsors feel that the formation of this co-operative marketing company is essential if the future prosperity of West Hertfordshire watercress growers is to be ensured. By doing this, they are providing themselves with a means of gaining better information on market trends, production techniques and costs and above all finding the skilled labour on their farms to increase production.

Medieval Farming

The village of Laxton, in Nottinghamshire, is an historical curiosity, a living museum of the rural past where farming, at a subsistence level, was organized on the basis of open fields and common pasturage. There are fragments of open field farming to be found in several parts of England, but here it can still be seen as a complete working example.

The village has been in the ownership of the Minister of Agriculture since 1951, when there was a danger, following the death of the sixth Lord Manvers, Lord of the Manor, that the land might be sold in lots and its unique character lost for ever.

So that the history of the village and its system of farming should be available in a convenient form for the many visitors to the area, Professor J. D. Chambers of the University of Nottingham was invited to write an illustrated Guide, and this has just been published by H.M. Stationery Office.

The author's interest and enthusiasm in his subject is evident throughout, and the book will no doubt appeal to a wide range of readers. For students of history and agricultural development its value will be obvious, and the layman with an historical sense will enjoy and be enthralled by the account of this last example of a system which in England has been followed for some twelve hundred years

Chapters are devoted to the history of the village, the farming system, the Manorial Court, the Church, the Castle and several other aspects of this survival from the past.

Price 3*s.* 6*d.* (3*s.* 11*d.* by post) from H. M. Stationery Office or through any bookseller.

JURY DAY AT LAXTON

A jury of twelve men and a foreman, all occupiers of land and property in Laxton, annually inspect the boundaries of the sykes and grass roads. New stakes are driven in to mark the boundaries between the common grass and the arable strips

Gaumont British made a film about Laxton in 1934 (black-and-white, sound 2 reels, running time 20 minutes). It is called *Medieval Village* (ref. no. F644) and can be hired for £1 from Gaumont British Library, Aintree Road, Perivale, Greenford, Middlesex.

Books

Onions and their Allies. HENRY A. JONES and LOUIS K. MANN. World Crop Series. Leonard Hill. 75*s*.

The bibliography gives the best guide to the contents of this book. It consists of several hundred references to the most exhaustive collection of research reports, scientific papers and general articles on every aspect of the principles and practice of onion growing, written over a number of years by authors from every part of the world.

This makes it undoubtedly the most comprehensive book ever written on the onion family, dealing as it does with production methods throughout the world.

On the other hand, the sub-title, 'Botany, Cultivation and Utilization', does not do justice to the very full information given on the science and practice of onion cultivation. The background notes include an interesting review of onion growing in other countries, and deal thoroughly with the economics of world production.

Considerable space is given up to a careful and detailed description of the members of the Allium family. These are all classified and are easily identified by the use of excellent illustrations. The sections on the morphology and chemical composition of the onion plant are of interest to students of botany and chemistry.

The advantages of hybrid onions are becoming more widely recognized, and the section dealing with genetics and plant breeding provides valuable guidance not only for the plant breeder but also for growers and seedsmen. There is also a useful chapter on onion seed production and seed saving.

The cultivation, harvesting and storing of onions is exhaustively covered and growers in this country will be fascinated by the account of large-scale production in the United States, where between a quarter and a third of the onion bulb crop is raised from transplants. Frequent comparisons are made with cultivation methods in different parts of the world.

One chapter only is devoted to the cultivation of other members of the onion family, including leeks, chives and Japanese bunching onions, but because of the extent of garlic production throughout the world, this crop is dealt with in greater detail.

Descriptions are given of pests and diseases and their control, and there is an extensive discussion on the use of herbicides.

The book is illustrated with over 100 photographs, and thirty tables present statistical and other data in a form which can be easily studied. Although written by Americans with the emphasis on production in the United States, it is of interest to everyone concerned with the cultivation of onions, and because it can be regarded as a standard work it should be in the library of every agricultural and horticultural teaching establishment in this country. As a book of reference on the Allium family it is indispensable. *W.G.H.*

Electricity in Horticulture. A. E. CANHAM. Macdonald. 25*s*.

When a new book arrives, and is written by such a commendable worker as Alan Canham, it is difficult to be entirely objective.

For many years now Mr. Canham has been accepted by horticulturists not as an engineer but as a competent plantsman who understands the use of electricity. Thus, in reading his book, I expected it to be authoritative, to cover the subject adequately, and to convey information in a practical way required by growers; and in this I was not disappointed.

There is no doubt about the need for a book on electricity in horticulture. Speaking generally, horticulturists as a body must be among the poorest equipped technically and practically to appreciate the extent to which electricity can, and should, be used to operate and control both environmental conditions and mechanical operations. More specifically the need is for growers to know what can be done, for workers to know how it is operated, and, most important, for students to appreciate the principles, opportunities and practical operations. Such information is now essential. It is supplied in this book, which should be amongst the most used on horticulturists' bookshelves.

On the book itself, the coverage of pratical uses is complete—the greater use of fluorescent lighting in potato chitting is the only omission in a clear, precise text, which is well supported by good diagrams and photographs.

My one wish, in reading the book, was that the chapter 'What is Electricity?' could usefully be extended in the same lucid language. So many of us are frustrated in trying to comprehend electrical equipment by not having sufficient basic knowledge to understand the purpose and implication of, for example, phases, and being unaccustomed to electrical terms, such as relays, etc. Perhaps in future editions this may be considered.

In all aspects it is a very worthwhile book. My only real complaint is that it should have arrived early in May when, in common with most horticulturists, I have time only for work or sleep! However, perhaps there is a point here. The more electricity is used for automatic watering, damping, ventilating, operation and control, the more time we shall have to enjoy reading and contemplation.

G.D.L.

An Introduction to Feeding Farm Livestock. R. H. NELSON. Pergamon Press. 8*s.* 6*d.*

The author has made a most commendable attempt to summarize in a simple form what is a relatively difficult subject, bearing in mind the students for whom the book is intended.

What material should be included and what left out is certainly at the discretion of the author, but it is surprising that no reference has been made to methods of assessing the energy value of foods (apart from that of starch equivalent).

The use of protein equivalent as a measure of protein in rations for ruminants could well have been replaced by the more realistic digestible crude protein.

The figures given for energy requirements for both maintenance and production for dairy cows are the conventional ones; attention might have been drawn to the fact that these figures are too low, especially in the case of high-yielding cows.

To find a table of hay equivalent and, on the same page, the very true statement that 'Silage and hay are very variable in quality and it is sound practice to have these foods analysed', will strike some students at least as not being particularly logical.

Although some obsolescent standards are used, this is, in the main, an excellent little book, and the pity is that students who use it may, on meeting the newer ideas on nutrition in some other literature, come to regard it with less respect than it deserves.

On the applied side the book is much stronger; a number of points too often overlooked, such as the importance of palatability in rations, the sensitivity of small pigs to temperature change and the like, are well made. Some may regard such points as glimpses of the obvious, but it is well to bear in mind that disregard for the obvious is more often a cause of failure in animal production than is the lack of a highly sophisticated technique.

R.G.J.

Potassium in Relation to Grassland Production. International Potash Institute. Berne.

In July, 1963, the International Potash Institute held its first regional conference. The European specialists who met at Wexford, Eire, heard and discussed six papers on soil potassium and ten on potassium manuring in relation to grassland management. The conference proceedings are now available as a 170-page book.

Since it deals in depth with a single subject of considerable practical and theoretical importance, this is a much more useful publication than some of the Institute's earlier, and more general, ones.

Dr. W. Dijkshoorn summarizes the latest Dutch work on the balance of uptake, utilization and accumulation of the major elements in grass. There is a review by Dr. G. W. Cooke of the general principles governing the potassium manuring of grassland, and the experimental work on which present recommendations rest. He emphasizes that to provide a better basis than we have at present, more research is required to determine the size of the pool of available soil potassium that will sustain the yield of herbage crops.

P. A. Gething reports experiments at the Cheshire School of Agriculture and at Farm Institutes in Warwickshire, Lincolnshire and Hampshire in which (contrary to earlier results from Scotland) no evidence was found of NK interaction, even where response to K was large.

Dr. J. Lowe describes trials which suggest that, under conditions of low nitrogen fertilization, the clover status and output of Northern Ireland's grasslands could be greatly improved by the more liberal use of potassium fertilizers.

The Irish Agricultural Institute's experiments at Johnstown Castle, Co. Wexford, and at Grange, Co. Meath, designed to determine the effects of pasture management on uptake of potassium by different swards, are described by D. Moloney and A. Conway. Another experiment at Johnstown Castle, reported by W. E. Murphy, is intended to show how various crop rotations influence the potassium balance of the soil.

Other contributors report on field trials in France, Germany, Norway, Denmark and Sweden.

Copies of the book may be obtained from the Institute, price Swiss F 6.

S.L.

Dairy Cattle Management. JAMES M. WING. Chapman and Hall. 84*s*.

Written and produced for the use of American undergraduates, professional dairymen and advisory workers, this book has a wide scope. It includes chapters on the evaluation of feedingstuffs, the effect of weather on animal physiology, lactation, forage crops, concentrate feeds, animal health and reproduction, buildings and allied equipment, and business policy. The eight appendices are virtually an integral unit in themselves, covering such subjects as breed development, milk recording and nutrient requirements. A bibliography is given for each chapter, which, coupled with a clear index and well-reproduced illustrations, makes the book most readable and easy to follow.

Throughout, the author aims at demonstrating how methods and practices are related directly to fundamental scientific facts. Thus, although generalizations cannot be avoided, there is the satisfactory feeling that if space permitted, each statement could be adequately confirmed. He has relied mainly on American experience and literature for his material, and provides some interesting insights into American dairy practices and problems. But where a fact could be better illustrated by reference to work done in other countries, this has been given. For example, the importance of the rate of stocking of pastures in determining milk output is stressed by including tables from experimental work conducted in Great Britain.

It is startling to learn that, although more than 75 tons of drugs are used annually in the United States for the treatment of mastitis, the incidence of the disease has not decreased in the last 15 years. There is a description of the preparation and training of cattle for showing and the author states that this is one of the most important jobs in the pedigree business.

This volume could well find a place on the shelves of agricultural libraries in this country both as a reference book and as an example to budding authors of a text-book which is well written and attractively produced.

M.E.C.

Man Must Eat. SIR WILLIAM SLATER. Univ. of Chicago Press. 28*s*.

This is the text of four lectures given by Sir William Slater to the University of Chicago, to which he has added an important introduction. The addresses were given in the nuclear medicine section of the Department of Pharmacology; but the talks cover a far wider field than might be imagined from the name of the section. The lectures deal with the historical development of research in agriculture, outline the part nuclear science now plays in agricultural research, and discuss the problems of adequately feeding our increasing numbers.

Although a short book, it is nevertheless very good. In only 112 pages, the author gives an admirable summary of the overall food position of the world, and the contrast between the standards of the 'have' and the 'have-not' nations and their problems.

Sir William's basic contention springs from the book's title and is that man, by the development of science, has learned to exercise a very considerable control over his environment. He extinguishes serious competitors for his food, which he preserves and distributes over long periods of time and over great distances.

The question the author postulates is: can man continue this environmental control and limit his own numbers in accordance with food availability? He says: 'Examination of the relation between man's survival and reproduction rates can lead only to the conclusion that his power to control his environment without any equivalent control of his rate of reproduction will, if these factors continue to operate unchanged, result in a position where his growing numbers are in the end checked by lack of food, over the production of which he has only limited control. In this he will only be repeating what has in the past happened to other species which have outgrown the available food supply.'

The book ends with an important subject, an account and comment on nuclear fall-out and food-chains.

It is a most stimulating work for those interested in the long-term implications of food for an increasing population, a problem which is already upon us.

G.O.

Economic Aspects of Farm Irrigation. K. A. INGERSENT. Univ. of Nottingham. 5*s*.

A survey was carried out in 1962 on 44 farms in Nottinghamshire and Lincolnshire; this book reports the findings, and compares the results with those obtained from a similar survey in 1961. The net capital cost, with Government grants deducted, was £986 per one-acre setting, with a range of £400 to £4,000. This amount of equipment would satisfactorily irrigate 30 to 40 acres during any drought period.

The total cost per acre inch was £2 13*s*. 10*d*. in 1962 as compared with £2 15*s*. 5*d*. in 1961; the range in 1962 being from 15*s*. 6*d*. to £7 13*s*. Variation in costs between farms are due mainly to the degree of utilization made of the equipment, and although the standard set is not realistic, the comparison does show that on many farms lack of crops requiring irrigation during a dry spell restricted the use of the equipment.

The other factor affecting costs was the use and organization of labour. On average, 2·58 man hours were required per acre inch applied, and the results suggest that the use of full-time operators makes for extravagant labour use.

The final chapter gives a useful example of methods of estimating the effect of irrigation on farm profits, and illustrates the more important points requiring consideration. Unfortunately, the author has used out-dated standards for estimating irrigation needs, which makes the comparisons and comments in this section almost valueless.

J.J.N.

ACKNOWLEDGMENT OF PHOTOGRAPHS

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PEOPLE IN PIGS in Suffolk

In the last twelve months 60 sows reared a total of 1,213 weaners. Feed for sows and piglets cost £3,034 (50s. 4d. per weaner) and the piglets sold at eight weeks for £6,974.
The sows run out winter and summer and receive one feed daily of Silcocks Pig Range Cobs.

Says Sir Anthony's manager Mr. John Warner:

"By ensuring that even the shyest feeders among the sows get their due ration, these Cobs help us achieve our aim of 20 weaners annually per sow. They also keep our labour costs down — the herd is run by only one pigman and a part-timer.

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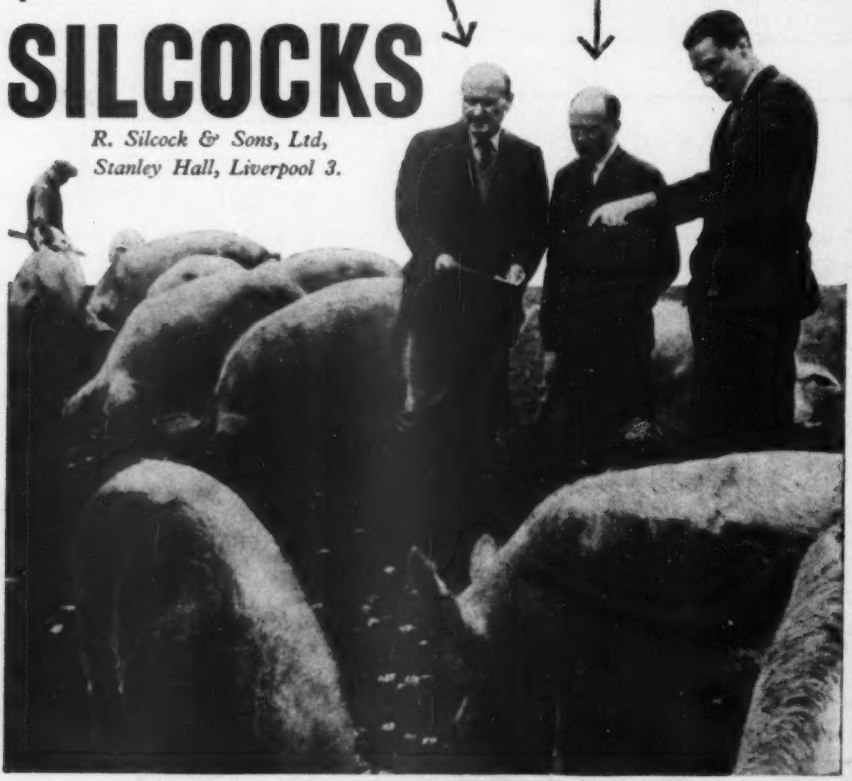
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